Machine Shop



AMERICAN SAW & MFG. COMPANY

20% FASTER, and with HIGHER PRECISION

on a new Heald Model 222 Bore-Matic

Here's a typical case where a new Heald machine meant more and better production at lower cost.

With this Heald Model 222 Bore-Matic, a manufacturer of compressor bodies has "upped" production 20%, improved product quality, and increased operator efficiency. Parts are now bored, faced and chamfered, two at a time, in a single automatic machine cycle. Faster indexing for greater cycle speed, constant feed hydraulic control for greater precision, and simplified

loading and handling have made these savings possible.

Such results don't "just happen."
They are the end product of years of research and engineering to produce a new line of Bore-Matics as well as Internal and Rotary Surface Grinders, which are especially designed for your present-day needs. So, whatever your precision finishing problems; why not get in touch with your nearest Heald representative. His job is to help you do your job better, and at lower cost.



VOL

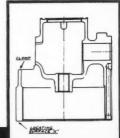
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THE 684

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Increased production of compressor blocks is due to a faster operating, easier loading new Heald Model 222 Bore-Matic. Drawing below shows surfaces borized.

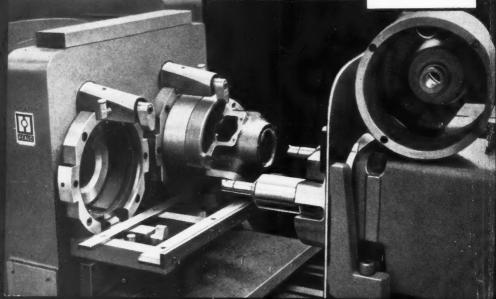




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FECHNOLOGY DEPARTMENT

VOLUME 21 NU/ R 9

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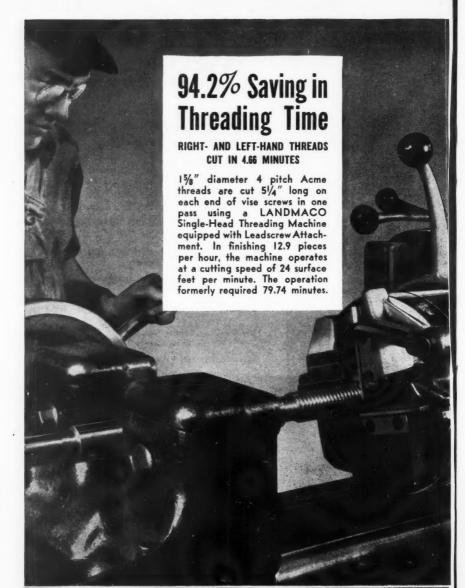
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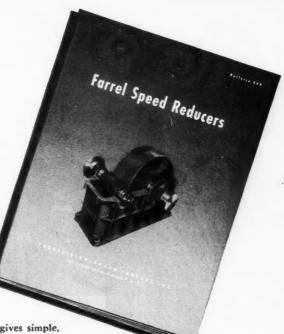
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it is easy
to select the
speed reducer
you require



This new 44-page bulletin gives simple, easy-to-understand directions for selecting speed reducers of the horsepower and speed you need. It contains specifications, horsepower rating tables, overhung load capacities, dimensions and weights of single and double reduction units.

Features of these reducers, which are also described in the bulletin, include Farrel-Sykes precision-generated, continuous tooth herringbone gears—the famous Gear with a Backbone; rigid and accu-

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Please send me, without cost or obligation, a copy of Bulletin 449, "Farrel Speed Reducers."

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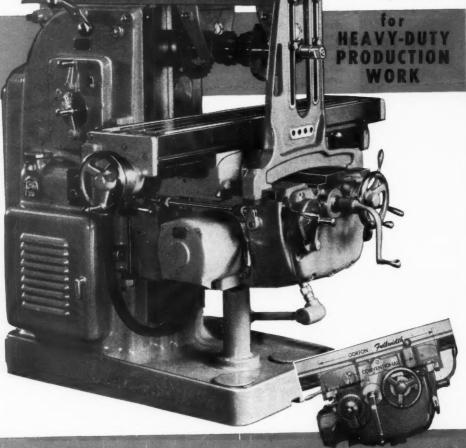
FB-502

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, 1949

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GORTON a 2-28B



NOTICE FULLWIDTH KNEE and compare with width of

CORTON

conventional models

Complete Information



Send for Bulletin 2321 today—see the extra value built into this production tool

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MACHINES BY
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All-New 10 H.P. Fullwidth No. 2 Horizontal PLAIN- Milling Machine

OUTSTANDING FEATURES

NEW in design; in construction; in performance.

DESIGNED AND BUILT as a correlated unit to do heavier work better and to take full advantage of extra power provided.

10 HORSEPOWER — PLUS: Full ten horsepower is delivered to the spindle; separate motor drives table, saddle and knee.

FULLWIDTH KNEE: Top knee bearing is almost twice as wide as on conventional No. 2 mills — see illustration at left. Rigidity closely approaches that of bed-type machines. SQUARE LOCK BEARING SURFACES with narrow center guides guard against knee tipping and saddle "cocking". RIGID SADDLE: Saddle bearing spread on knee almost equals table travel. Four solid ribs reinforce saddle structure. PRECISION BALANCED SPINDLE provides mass and weight of metal close to spindle nose with built-in flywheel action, but without superfluous parts.

OTHER FEATURES: Efficient, simplified gear train; full directional controls; automatic lubrication; simplified coolant system; improved electrical controls — all these provide a rugged machine built to do a bigger and better job on the production line. Write for complete information today — see bulletin illustrated above.

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Well, there's a big difference in taps and also in the meaning of "quickly."

Here at Hanson-Whitney we know that taps are expendable to a degree ... but the degree depends upon many factors such as tap selection, type of operation, work material and lubrication.

If you are having troubles with tap breakage and tap wear we suggest that you do two things, 1) Write for our engineering suggestions, 2) Specify Hanson-Whitney taps . . . finished after hardening. There are no finer taps made.

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1HW49

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Power Rapid Traverses for side carriage and cross slide are controlled by dual levers, thus permitting them to move independently or together.

GISHOLT MACHINE COMPANY

Madison 10. Wisconsin



Gisholt's more versatile power rapid traverse reduces time lag between cuts, speeds production, saves time and money. This has been a standard Gisholt feature for over twenty years.



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THE GISHOLT ROUND TABLE

represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS BALANCERS • SPECIAL MACHINES

YOU GET HIGHER PRODUCTION

when the operator can forget about the grinding cycle



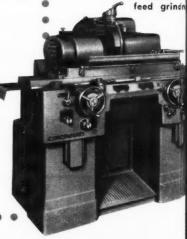
Above: Close-up of a controlled truing devia

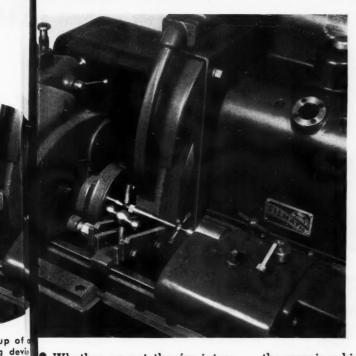
Below: CINCINNATI FILMII 4" Plain Hydraulic Grid ing Machine, equippedic automaticin



Drawing of part, actual size. Ground diameters are indicated in color.

Part nameMicrometer barrel
MaterialSteel
OperationGrind diameter and chamfer
Stock removal
Production200 per hour







Left: Close-up of work, loading cradles, and hydraulic footstock



 Whether or not they're intentional, slowdowns hurt everybody. The unintentional ones occur when high production ippedfo workers have to pay close attengrinda tion to their machines. CINCINNATI has developed labor-aiding equipment for several types of grinding machines, which literally take over the job of paying minute attention to what's going on. One of them is illustrated here—a cincinnati FILMATIC 4" Plain Hydraulic Grinder, with automatic infeed, hydraulic footstock, and loading cradles. Here's

the way in which this equipment helps the operator grind 200 parts per hour.

Place the mandreled work on the loading cradles, move the infeed lever slightly, and then forget about the remainder of the grinding cycle. It proceeds automatically.

Equipment of this type does not retard use of the machine for conventional traverse grinding. Most shops could use it. May we send booklet G-551-1?

CINCINNATI GRINDERS INCORPORATED

CINCINNATI 9, OHIO, U.S.A.

CENTER TYPE GRINDING MACHINES . CENTERLESS LAPPING MACHINES . CENTERLESS GRINDING MACHINES

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Here's Why

THE

DOES THE WORK OF TWO OR MORE MACHINES

A tilting, swivel table that entirely eliminates special jias, angle plates and other expensive fixtures usually required for special or complicated milling, boring or shaping jobs.

Exceptional capacity and flexibility make it easy for the Knight No. 40 to do jobs which often require transfers to two or more special machines.

- Sixteen table and spindle feed changes plus four vertical spindle feeds allow the use of a wide range of cutting tools.
- A Correctly located full vision controls for direction, speeds and feeds provide the most in convenient, simple operation.
- 5 Heavy, strong, one-piece column casting, wide accurate bearings and precision gearing insures the rigidity which means absolute accuracy and long service life.

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MACHINERY COMPANY



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MORE GOODS for MORE PEOPLE at LOWER COST

Title



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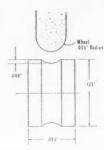
St. Louis

y, 1949





4" x 12" Type H Plain Hydraulic Grinder (Catalog A44)



Tiny Ball-Bearings

Ground to

features of standard machines

All Controls Convenient for Operator ,
Hydraulic Work Traverse
Headstock Driven by Adjustable
Speed Motor
Hydraulic Automatic Wheel Feed
Two Speed Hand Traverse

Precision Tool

optional equipment
illustrated Hydraulic Timer
Hydraulic Straight Infeed
Live Spindle Headstock
Hydraulic Chucking



Here are the results reported grinding this tiny ball bearing inner race:

"Raceways of the inner rings are plunge ground to form, on the Landis Tool 4" x 12"
Type H hydraulic grinder with hydraulic timer, to a size tolerance of plus or minus .000025" on the track diameter, radius true within .00005", run-out zero by 1/10,000 indicator, at a production rate of 50 pieces per hour."

A standard 4" Type H grinder was used

with hydraulic straight infeed to the wheel base, hydraulic timer and a radial dresser. This aided high production, since it gave a semi-automatic operating cycle.

You may have an entirely different grinding problem. Do you require high precision, large production, fine finishes... or reduced costs? Our engineers will be glad to make production estimates and tooling suggestions on the basis of your blue prints.

885

FOSDICK Sensitive RADIALS handle high speed sensitive jobs with radial drill flexibility



Fosdick Sensitive Radial operating at Welding Engineers, Inc., Norristown, Pa.

 To handle this job on a sensitive it would have required a special fixture to me the work. To have handled it on a standardial it would have been entirely too sw In either case the costs would be prohibed for small lot operation.

That's where the Fosdick Sensitive Radials save both time and costs. It will hall holes up to $1\frac{1}{2}$ " diameter and has be designed for drilling holes at various ceed distances at one setting of the work and what the number of pieces is small.

Note the design embodies an arm at the height on adjustable table in addition to the conventional base. The arm and table is swing in an arc of 360°.

The adjustable table enables operator to position the table correctly for any job.

The head of simple design produces in speeds and four speeds. Spindle speeds low as 60 R.P.M. and as high as 3500 R.I.M. are available.

For a moderate investment this new Sensili Radial is paying off in versatility—ease operation and low costs.

> Get all the facts. Write for Fosdick Sensitive Radial Bulletin. S.R.M.M.S.

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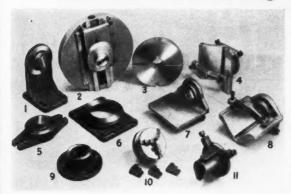
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Save Hours of Set-up Time!

with the Amazing NEW Superior Adjustable Face Plate and Work Holding Attachments



For Machining
regular or odd shapes
and sizes on
lathes, drill presses,
shapers, grinders,
boring machines
and millers.

Save hours of time and labor in tool rooms and machine shops . . . eliminate expensive jigs and fixtures for short runs, repairs or experimental work.

LOOK AT A FEW TYPICAL SET-UPS

Angle Base.
 Face Plate.
 "T" Slot Plate.
 Vertical "V" Plate.
 Base Block.
 Plate Adapter Base.
 "L" Plate.
 Plate Adapter.
 3-Jaw Chuck.
 Dog Head.



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M.S.

Angle plate attachment holding work for turning, drilling or facing.



Work being held in horizontal "V" for boring, drilling or turning.



Ell plate and angle base assembly.



Assembly of Vertical "V" on compound.

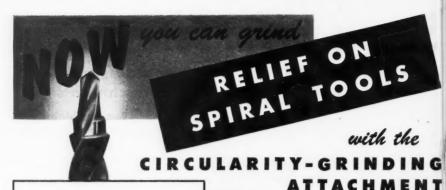
After work piece is fastened to face plate by work holding attachment, it can be moved in any direction by two simple adjustments. Operations at any radial or angular relation to each other can be performed on any machine without moving work piece from holding attachment. Thus complicated work can be performed on any machine without highest skilled mechanics.

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- GRIND FORM RELIEF
- GRIND RADIAL AND FORM RELIEF AT ONCE
- **GRIND OUT FLUTES**
- GRIND ALL TYPES OF CIR-CULAR FORM TOOLS WITH SPIRAL FORM . . . life-time relief
- GRIND RELIEF ON O.D. AND FACE OF STEP TOOLS AT SAME TIME WITH .005" MAX. RADIUS IN CORNER

Also used as motor-driven headstock for grinding straight or tapered cylindrical work



Grinds any length FLUTE STRAIGHT or TAPERED

The Circularity-Grinding Attachment accurately and easily produces form, radial or form and radial relief together on both straight and spiral fluted tools ... on any lead or spiral. The amount of relief and spiral is quickly set up by scales on the attachment and relief produced is identical on every tool ground from the same set-up.

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16

DETROIT REAMER & TOOL CO.

Mfrs. of Special High Speed Cutting Tools
2830 East 7 Mile Rd. Detroit 12, Michigan

MODERN MACHINE SHOP

February, 1949

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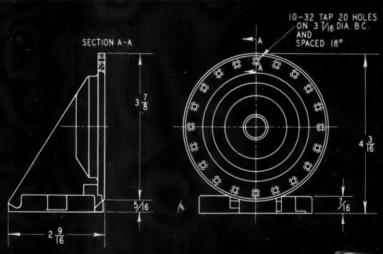
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PRODUCTION INCREASED 100% over Previous Method

with NATCO High Speed Sensitive Drilling and Tapping Machine



Part—Die Cast Diaphragm Cover Operations—Tap Ten 10-32 Holes Index Tap Ten 10-32 Holes

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Production—Approximately 300 Parts Per Hour

NATCO A33 Multi-Spindle Machines are built specifically to help you obtain more economical high speed, light sensitive drilling and tapping operations in your plant. They make possible remarkably high production and low hole cost in a wide range of small and medium sized work. Whether your production involves drilling and tapping operations in cast iron, in steel, in aluminum, in plastics or in wood, NATCO welcomes your inquiry and suggests that you send prints wherever possible. Write today! DETROIT PUBLIC LIBRARY

IMPORTANT—Be sure your name is on our mailing list to receive "Success Stories from the Brief Case of Natco Field Engineer"

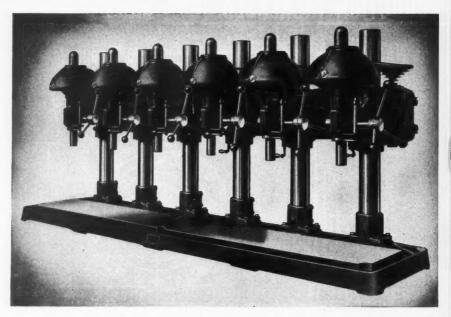
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Bufalo

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No. 18 Drills

Six spindles — the required operational setups on each drill—and production flows right down the line without hesitating for speed and other setup changes! Above is just one of the twelve models of husky, accurate, easy-handling "Buffalo" No. 18 Drills saving money for manufacturers! Capacities up to 1". Bench or floor models, one to six spindles. Put a No. 18 on your line and watch turnout ZOOM!

WRITE FOR BULLETIN 3123-B



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—choose from 12 models the one exactly suited to your production drilling requirements! All proven in the shop!

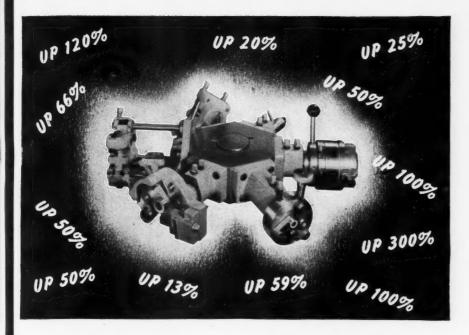
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BUFFALO FORGE

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Canadian Blower & Forge Co.,
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WARNER & SWASEY STANDARD TOOLS pay off!

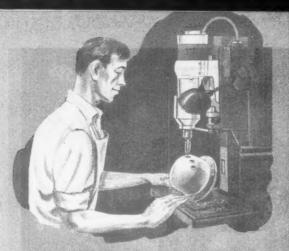
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Where tight, close joints are required, for pipe or similar applications, WINTER TAPER PIPE TAPS have proved their efficiency. Winter toper pipe taps are also furnished with interrupted thread for tapping tough metals, or metals that tend to load up on the tap. In addition to taper pipe taps, Winter offers a complete line of taps and dies, including chip driver, hand, machine screw, nut, pulley, stove bolt, and tapper taps.





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YOUR LOCAL DISTRIBUTOR carries a complete stock of WINTER taps on his shelves—as close to your tapping problems as the telephone on your desk

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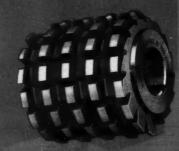
WINTER BROTHERS COMPANY - Division of the National Twist Drill and Tool Company Rochoster, Michigan, U.S.A. Distributors in Principal Cities - Branches in New York, Detroit, Chicago, San Francisco



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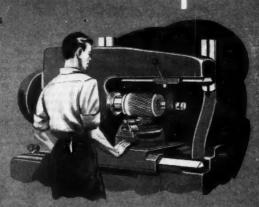
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NATIONAL GRAR HOBS and SPLINE SHAFT HOBS are made under closely controlled hardening and menufacturing conditions.

Due to these closely controlled conditions, maximum securacy and tool life can be expected. Other types of National Hobs for roller and silent chain sprockets as well as for special shapes are made to individual specifications. National also manufactures a complete line of rotary metal cutting tools, including twist drills, reamers, counterbores,





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LEADING DISTRIBUTORS EVERYWHERE offer complete stocks of NATIONAL cutting tools. Call them for cutting tools or any other staple industrial passibuth.

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. . . cutting off test specimens in the Metal-lurgical Laboratory of this giant steel plant. There is no time for pampering here. Each saw must handle anything that comes, as it comesthe hardest steels and toughest alloys, in all degrees of hardness—in any size, any form or condition—because each heat, each drawing, and each forming run has to be tested. The steel mill where these pictures were taken reports that these saws have been oper-

ating 24 hours, 7 days a week for the last five years. Maintenance cost has been practically non-existent. Furthermore, the efficiency of these saws has made possible the elimination

of an equal number of other sawing machines in the department.

The answer to your cut-off problem, whether large or small, will be found in our new C48 catalog. The services of our field engineers are also available in every locality. Send for either or both now.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People" Chicago 39, U.S.A. 5700 Bloomingdale Ave.





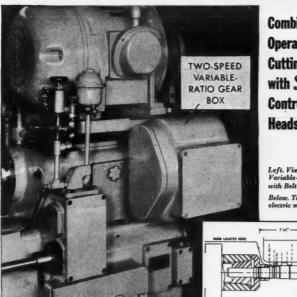


No. 24 Series



MACHINE OF THE MONTH

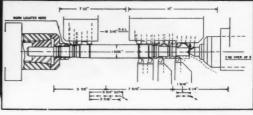
PREPARED BY THE SENECA FALLS MACHINE CO. "THE So-owing PEOPLE" SENECA FALLS, NEW YORK



Combined Turning and Squaring
Operations at Different
Cutting Speeds Now Possible
with So-swing Automatically
Controlled Two-Speed
Headstock

Left. View of two-speed, Variable-Ratio Gear Box with Belt Guards removed.

Below. Tooling layout for electric motor shaft.



Problem: To turn, face and undercut shoulders on electric motor shafts, using cemented carbide tools for the turning operations and high speed steel tools for facing, grooving and chamfering operations which require a very smooth finish. Both operations to be made in one handling with automatic spindle speed change between the turning and squaring operations.

her C48 are

Solution: The Model "LR" Automatic Lo-swing Lathe selected for this job was equipped with a Two-Speed, Variable-Ratio, Gear Box shown in the illustration. The speed change from high to low and back to high again in a single machine cycle is controlled by two adjustable cams, mounted on the main cam shaft, which may be set to operate the multiple disc clutch at any time during the machine cycle. The ratio between the high and low speeds may be modified through pick-off gears to suit special conditions without removing or dismantling the gear box.

The tooling layout shows the second of two operations on

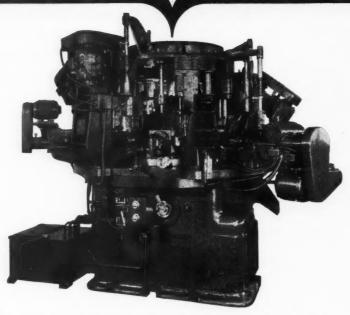
a 1½" diameter electric motor shaft. The shaft is held and driven, on a previously turned diameter, in an airoperated collet ehuck which grips the shaft well in from the end, exposing only the part to be machined. This method reduces the shaft's effective length and eliminates springing due to the rigid grip of the collet. The work is positively located from a previously finished shoulder, insuring accuracy of shoulder lengths.

The shaft diameters are turned with sintered carbide tools mounted on the front carriage, cutting at a surface speed of 350 ft. per minute. The squaring and forming tools are mounted on the rear slide and operate at a surface speed of 70 ft. per minute, insuring a very high poished surface on the shoulders and formed grooves. This combination assures high production, coupled with smoothly finished shoulders, both of which are very desirable on electric motor shafts.

Consult Seneca Falls engineers for assistance in solving your automatic turning problems.

SENECA FALLS MACHINE CO., SENECA FALLS, N.Y.

EVERY MACHINE FUNCTION IS AUTOMATIC ON THIS MORRIS MOR-SPEED PRODUCTION MACHINE



On this machine the operator merely loads and unloads the work while machine is operating on the piece. All machine functions including the indexing are automatic.

The machine drills—taps—spotfaces—and reams careburetor main bodies on a mass production basis for a prominent automobile concern.

The machine of vertical design has 12 automatic indexing four position fixtures, 20 drilling spindles, 7 facing spindles, 15 tapping spindles, 1 brush spindle and 4 reaming spindles and turns out a complete piece at every index of the turret.

Here is another typical instance of where Morris developed the machine to meet specific job conditions. If you are interested in the high production of work requiring drilling, reaming, tapping, facing and similar operations consult Morris—they have the experience, engineering ability and facilities to help you.





Dust chutes cause no inter-ference with large pieces.



Guard raises, or swings clear, to expose any part of belt.







With platen down, pieces are worked from under belt.

Low cost! Portable! Takes little floor space! Does many metal-removing operations formerly requiring heavy, expensive machines! DELTA Belt Grinding,

> Can be used to do all this—and more! • Clean out slots • Remove flash in corners Remove fins • Smooth up crowns • Remove nibs

· Remove parting lines · Chamfer corners

You speed up flashing, grinding, cleaning, grinding, clean-ing, and polishing, with this new Delta Belt Grinding, Pol-ishing, and Debur-ring Machine. You save time, labor, and material.

In this condensed

unit on a welded steel stand, you get a production machine at low initial cost. With acces-

sprior to meet your particular requirements, it does hundreds of different jobs.

There are no set-up wheels to bother with; no grinding wheels to dress. Instead, you use coated abrasive belts that are inexpensive, long-wearing, quick and

neary to replace.

By Delta Belt Grinding, Polishing, and Deburring Machine is carefully engineered for long, trouble-free service. Delta quality features assure you of that: Precision-bored double, therefore the ball bearings. Precision-bored bearing seats. Dynamically-balanced pulleys. All-around rugged construction. Delta Dust Collector available for use with this unit protects workers' health and

expensive machinery.

Make metal-removing fast and economical. Put Delta
Belt Grinding, Polishing, and Deburring Machines to
work foryou on your production line—and in your inspection department, to clean up imperfections on the spot.

Have your nearby Delta distributor show you this
new machine. Send coupon for free Bulletin AD369.

Ask your distributor about easy time-payment plan!

DELTA MANUFACTURING DIVISION

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	Tide
	Company
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	City State





Drilling and Tapping Simplified by This Combination Set-Up

WITH the above set-up, consisting of two loading fixtures, one having 3 Govro-Nelson Units and the other 2 Govro-Nelson Units, drilling and tapping of the same piece has been greatly simplified, a single operator handling both operations.

Three holes are drilled at once and two holes tapped at once, the operator loading the drilling station during the tapping operation, and vice versa. The result is approximately twice the production formerly obtained when parts were drilled and tapped on separate machines.

If you have similar operations, send samples and part prints and we shall be pleased to recommend the proper Automatic Units or quote on a complete set-up. Literature sent upon request.



GOVRO-NELSON CO.

Machinists of Precision Parts for 25 Years 1933 Antoinette, Detroit 8, Mich.

Automatic DRILLING UNIT

MODERN MACHINE SHOP

February, 1949

by a tribi ies c

And they doubled production-



without adding men, materials or machines:

HOW WOULD you like to see:

Your production of pieces per tool grind upped 300%? Rough grinding operations eliminated? Work speeds quadrupled? Finishes improved? More work squeezed from your machines? Wear problems licked? Work held to closer tolerances?



In the manufacture of dairy equipment, a simple change to Carboloy brought every one of these advantages.

Production more than doubled, and despite a 16% raise in labor rate and increases in material costs, cost per piece was not increased.

How can you get these results?

The benefits of Carbide can

apply to your operations, too. Find out how: call in a Carboloy engineer.

His knowledge of carbides, with your engineers' knowledge of your production problems, can cure many of your production ills, even if you're already using carbides to some extent.

Call in Your Carboloy engineer

He'll gladly assist you. And he can help you select the most economical tooling from any of Carboloy's 600 standard tools and blanks, or special Carbide-tipped tools made by more than 150 tool manufacturers.

So why not get in touch with him?—or write us direct:

CARBOLOY COMPANY, INC.

11143 E. 8 Mile Ave., Detroit 32, Mich.





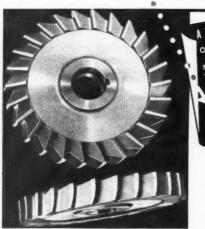
ies coast to coast.

YES . . . in a recent comparative performance test, 150 Aber "Curved Tooth" milling cutters out-performed 425 conventional type milling cutters - a 21/2 to 1 increase at NO EXTRA COST!

Designed and developed specifically for production men who look to NEW tool designs to reduce top-heavy metal cutting costs, Aber "Curved Tooth" milling cutters operate at speeds 10% to 25% faster than standard straight tooth milling cutters in addition to providing smoother finishes and



close to tolerance operations. Utilizing the most outstanding tooth design developed in the past decade, Aber Engineering Company produces a complete line of quality milling cutters featuring the "Curved Tooth" principle.



A TYPICAL ABER "CURVED TOOTH" PERFORMANCE OPERATION: Milling lugs on plate. Slotting and side milling TOOL SETUP: (1) R. H. and L. H. Shear Side Milling Culter MACHINE: Cincinatti 3-Spindle Mill. (1) L. H. Half Side Milling Cutter. PERFORMANCE: 16-1 2 hours between girnds Best previous H. S. S. milling cutters was 6-1. 2 hou

ENGINEERING WORKS INC. WATERFORD, WISCONSIN

SNO

Febru

MEET SOARING PRODUCTION COSTS

AIR - OPERATED **ELECTRICALLY CONTROLLED** DRILLING , TAPPING AND THREADING MACHINES

 Today's severe competition will be worse tomorrow. It cannot be met with vesterday's machine tools. The new Snow Full Universal Air-operated, Electrically Controlled Drillers, Tappers and Threaders are the answer for maximum production of small parts. • Typical of advanced design and amazing performance is the Snow Full Universal Drilling Machine (bottom left). Drill sets its own rate of feed for increased output and greater tool economy. In thousands of installations it has demonstrated capacities of 6000 pieces per hour. Numerous types of Snow air-operated indexing and clamping fixtures and jigs are available for instant synchronizing to the machines. Our

engineers will gladly study your parts and blue prints and submit highly profitable suggestions. Send for data



on all these Snow machines. · Snow Full Universal Air Operated Electrically Controlled Threading Machines, 2 sizes cove a range from #3 to 1 in mild steel. · Snow Full Universal Air Operated Electrically Controlled Drilling Machines. 2 sizes cove a range from #60 to

SNOW MANUFACTURING COMPANY 441 EASTERN AVE., BELLWOOD, ILL. (SUBURB OF CHICAGO)

Snow Full Universal Air

Operated Electrically Controlled Tapping Machines. 4 sizes cover

a range from #0 to

Sentry HIGH SPEED STEEL A" INTO HY-PRO TAPS



3 OF 5 SENTRY FURNACES IN THE PLANT OF HY-PRO TOOL CO., NEW BEDFORD, MASS., MAKERS OF HY-PRO TAPS

Investigate Sentry
Today!



ADVANTAGES IN HIGH SPEED STEEL HARDENING.

or in tool room, Sentry Model "Y" Furnaces assure quick, easy, economical heat treatment of H. S. Steel cutting and form tools. The Sentry Diamond Block Method of maintaining a neutral atmosphere permits soaking of high alloy steels to obtain full hardness and proper structure without danger of surface oxidation, reduction in size or decarburization. Resultant tools will show increased production capacity, high resistance to breakage and long life.

WRITE FOR BULLETIN 1054-E11

Sentry Company

FOXBORO. MASS.. U.S.A.





produced 15,000 threaded holes per tap
HY-PRO ENGINEERING cut tap costs
and increased production to 21,000

PART: Pressed steel tubular nut.

PROBLEM: A leading special products manufacturer was tapping with a \(\frac{5}{16} - 18 \) spiral point tap to a depth of \(\frac{3}{4}'' \) full thread in tough, stringy steel. To average 15,000 holes per tap, many required lapping to size and all were specially surface treated. A costly, time-consuming process for the user.

Then they called in a Hy-Pro Engineer.

HY-PRO SOLUTION: He recommended a Hy-Pro quality controlled %₁₆ - 18 spiral point tap with an exclusive Hy-Pro surface treatment that provides longer wear and proper lubrication. Production now consistently runs 21,000 threaded holes per Hy-Pro tap — and they are used without modification.

Above is a typical example of how the Hy-Pro Sales Engineer can help increase threaded-hole production. His expert engineering counsel backed by the most up-to-date tap production methods combine to solve tapping problems rapidly and profitably.

Let Hy-Pro solve your tapping problem — call a Hy-Pro Sales Engineer today.

Order from your Distributor



Y-PRO TOOL CO.

NEW BEDFORD, MASSACHUSETTS

A SUBSIDIARY OF CONTINENTAL SCREW COMPANY

DEPENDABLE ACCURACY



INSPECTION TOOLS made of MEEHANITE METAL are designed to fill your various Inspection and Checking needs. Sturdily constructed to give you reliable, accurate service.

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Flat Parallels

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Toolmakers' Knees

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Angle Attachments

Try Squares



ALSO SURFACE PLATES RESCRAPED LIKE NEW

DELIVERY FROM STOCK

ACME BENCH VISES

Practical Design
Sturdy Construction

Acme Bench Vises light or heavy duty, are being used in more and more factories, because of these outstanding features:

Precision Built

Greater Holding Power
Totally Enclosed Body
Practically Indestructible
Interchangeable Ground Jaws





MODERN MACHINE SHOP

February, 1949

MORE GEARS IN LESS TIME!



With BARBER-COLMAN "MULTITHREAD" HOBS

Finish, production, tool life - all 3 have improved with a changeover to Barber-Colman "Multithread" hobs on this finish hobbing operation. The use of "Multithreads" depends on machine conditions and the particular characteristics of the gears to be cut. Under the proper conditions, as in this case, more gears are produced in less time, with substantial production savings. This job, for example, shows 25% better finish, 24 more gears per hob setting, 10 more settings per sharpening, and production time cut from 95 to 60 minutes per load.



METHODS ENGINEERS! GET THIS FREE DATA -SEND FOR FILE No. 356

-Finish Hob 12/14 Pitch Gears, 8 per load. Jarber-Colman No. 16-16

Roll with ma within .002".

We are anxious to demonstrate what "Multithreads" can do for other production hobbing jobs, and we invite questions and job specifications. Ask your Barber-Colman representatives for an analysis of "Multithreads" on your jobs.

Barber-Colman Company GENERAL OFFICE AND PLANT 356 Loomis Street, Rockford, III., U.S.A.





















FOR ALL TYPES OF INDUSTRY

Throughout the metal working field there are many parts that can be successfully surface broachedfaster, more accurately and at less tool maintenance cost than possible with present methods. We will be glad to work with you on the application of Footburt surface broaching machines on your work. Just write.

THE FOOTE-BURT COMPANY

Cleveland 8, Ohio Detroit Office: General Motors Building



on COOLANT problems HERE'S THE ANSWER!



To solve your coolant problems, both as to efficiency and economy, send for Ruthman Machinery's new catalog today. You will find it invaluable in choosing the correct coolant pump for your metal working machines.

THE RUTHMAN MACHINERY CO.

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THE MOST POWERFUL %" ELECTRIC IMPACT WRENCH EVER BUILT!

COMBINING TWO PROVED FEATURES!

The famous Thor heavy duty electric motor . . . standard in Thor electric tools for 35 years. The powerful, durable striking mechanism—of the same type so widely preferred in Thor pneumatic impact wrenches.

> See your Thor Distributor or Jobber today, or write for Circular No. 1025

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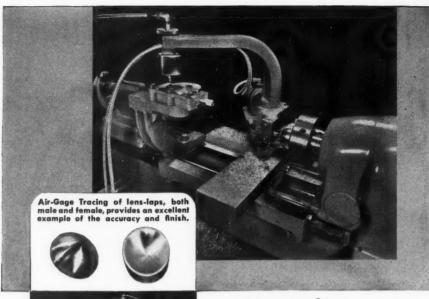


A 1 2 PUNCH THAT
DELIVERS EFFICIENCY FOR
NUT SETTING • SCREWDRIVING
DRILLING IN STEEL, WOOD,
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NOW All the Advantages of AIR-GAGE TRACING Available for SMALL, HIGH-SPEED WORK

• Here's a new Monarch high-speed contour turning team to push your costs way down.

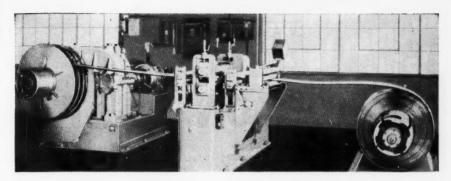
The proved advantages of Air-Gage Tracing now are available on the famous Monarch high-speed 10" EE Precision Manufacturing Lathe.

By the exclusive Air-Gage Tracing method you can turn step shafts; turn, bore and face contours of innumerable kinds. This is done in a fraction of the usual machining time, at

a fraction of normal costs—and with better accuracy and finish. Let us supply you with complete details.

THE MONARCH MACHINE TOOL CO., Sidney, Ohio

FOR A GOOD TURN FASTER - TURN TO MONARCH TURNING MACHINES



For Monthly Requirements Upwards of 500 Tons, a

YODER Rotary Gang Slitter

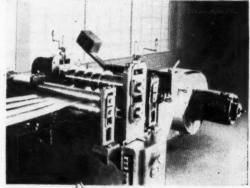
becomes a highly profitable investment. It will often pay for itself in the first 100 days of operation. Its yearly earning potential is extremely high when measured against its first cost and operating cost.

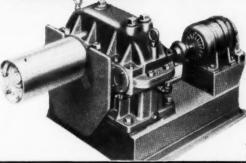
Yoder standardized series of slitters for coils and sheets are notable for their rugged construction and the many refinements designed for greater ease of operation, reduced labor costs and improved accuracy. Tolerances may be held within .004", plus or minus, of absolute accuracy and even closer.

Literature, Estimates and Recommendations for the asking.

THE YODER COMPANY

5532 Walworth Avenue CLEVELAND 2, OHIO, U.S.A.







ROLL FORMING, TUBE MILL AND
SLITTING MACHINERY

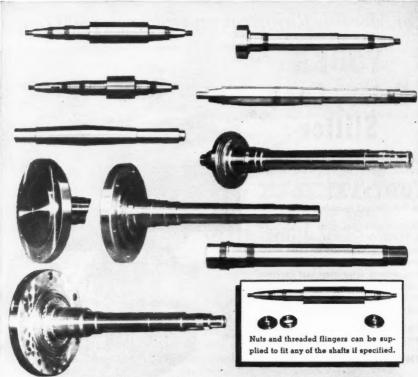
36 YEARS' LEADERSHIP . COILING . SLITTING . FORMING . EMBOSSING . CURYING . WELDING . CUTTING-OFF

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PRECISION SHAFTS

We are now in a position to supply precision shafts made to your own designs and specifica-

tions as to material and tolerances, with ground threads and dynamically balanced if required.



Send us drawings and specifications, and let us quote on your requirements

No. 57



POPE MACHINERY CORPORATION

ESTABLISHED 1920

261 RIVER STREET • HAVERHILL, MASSACHUSETTS BUILDERS OF PRECISION SPINDLES



How to cut costs with the NEW ROTOR 360 CYCLE TOOLS

THE new Rotor 360 Cycle Tools develop nearly twice the power of 180 cycle tools with the same size motor and develop more power per pound than any other type of portable tool.

The 6-inch, 360 Cycle Rotor Grinder shown weighs only 12½ lbs., operates at free speed of 6000 R.P.M. and under full load at 5700

R.P.M. This light weight and high speed under load means greater production . . . lower costs.

Call the Rotor Analyst for full information on this remarkable new line of Rotor grinders, sanders, buffers and polishers. Write for free copy of Bulletin 36.

360 CYCLE O'TOOL

AIR

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ind ed.

ROTOR TOOL

HIGH

9 reasons why Bliss Inclinable



Bliss No. 30, 200-ton Enclosed Inclinable Press



Rails and ties for Lionel electric toy trains are assembled at the rate of 1250 per hour in this Bliss No. 21 Inclinable Press with 48", 8-Station Bliss dial feed and a staking die.

You have only to look "inside" a Bliss Inclinable Press to see where it gets its ruggedness and almost indestructible precision. Why it delivers consistent, uninterrupted performance over the entire range of press operations from blanking to drawing. Why it's the most-specified inclinable press among stamping shops and fabricators, with over 50,000 in use throughout industry.

Let's take a Bliss Inclinable apart pictorially and examine the physical reasons for its ruggedness and precision...whether it be a 10-ton or 200-ton press out of Bliss' range of standard sizes.



FRAME





Strong and durable press frames of high tensile Mechanite castings are produced under rigidly controlled foundry practices. These three-dimensional drawings show the distribution of graphite in ordinary cast-iron (left) as compared with controlled graphite structure of Mechanite casting (right) used in Bilss presses.

0

CLUTCH



Often described as the finest positive clutch available on any press, Bliss patented Rolling Key Clutch is standard feature of Bliss Inclinables up to 5½" shaft. Note location of clutch keys near shaft center. This means slower-moving points of engagement, faster operating speeds, less shock during intermittent operation and longer life to all moving parts. Bliss Inclinables can also be equipped with air-operated friction clutch, which is standard for presses of 6" shaft diameter or larger.

Presses outsell all other makes

CONNECTIONS

Another feature is solid, plugclamp connection strap, which gives full 360° bearing against slide adjusting screw. This arrangement also permits using V-thread on screw, making replacement easy.



SLIDE ASSEMBLY



Sildes are accurately gibbed to insure precise registry of die and punch. Ball seat is renewable, as are split bronze ball-cap bushings and laminated shim against which ball-cap is brought down by four bolts to give correct clearance for proper lubrication and fit. All parts are machined to close tolerances for interchangeability. For a fraction of the cost of a new slide, you can recondition the ball seat bearing.

BEARINGS, WAYS AND GIBS

Main shaft bearings and connection bearings are bronze bushed. Roller Bearings are standard for drive shaft bearings on large geared presses. All wearing surfaces are especially finished to insure long life.

CUSHIONS



te

ns

Every Bliss Inclinable Press is designed to accommodate Bliss Marquette die cushions which extend the press application to drawing operations on medium

Many Bliss cushions are supplied for presses that have been in use for years. Placing the responsibiity for efficient press and cushion operation with Bliss assures you of the utmost in satisfactory performance.

LUBRICATION

Bliss Inclinables have floor-line lubrication systems with oil or grease fittings at main points of moving contact. All standard Bliss Inclinable frames are machined to take Bljur one-shot pressure system.



FEEDS



Bliss Inclinable Presses are designed to take any type of Bliss automatic or semi-automatic feed. Addition of a few extra parts to the regular constant tension brake will convert it to an automatic releasing brake for continuous operation with roll, dial or magazine feeds. Every Bliss feed is engineered to specific requirements yet a large variety of standard designs is available. A Bliss feed on a Bliss press means the finest equipment that money can buy, plus a single responsibility for efficient performance of entire unit.

SERVICE

All replacement parts and service orders carry top priority at Bliss to reduce your press "down time." Supplying service parts for presses more than 50 years old is routine at Bliss. Accurate-fitting parts are supplied from stock by virtue of precision manufacturing methods which guarantee interchangeability. A large sales and service organization is available. Incidentally, one effective way of preventing costly shutdowns is to call for a Bliss service inspection of your Bliss presses. A highly competent maintenance man will call on you and the chances are that he will spot trouble before it happens,



The Bliss plant at Hastings, Michigan is specially equipped for quantity production of parts for Inclinable Presses.

These are the reasons—plus the fact that they are priced right—that are most often reported by the trade for its preference of Bliss presses.

If your pressed-metal production calls for inclinable presses, you're sure to find the specific answer among Bliss' standard sizes. And a Bliss sales engineer will be on hand to give you unbiased counsel. Remember too, "BLISS" on your press is more than a name...it's a guarantee!

Write today for catalog 2-Billustrating the new Bliss Inclinable Presses and Service Sheet A-105 giving operating and maintenance instructions for the complete line.

E. W. BLISS COMPANY, DETROIT 2, MICHIGAN
Mechanical and Hydraulic Presses, Rolling Mills, Container Machinery

WORKS AT: Toledo, Cleveland, Salem, Ohio; Hastings, Mich.; Englewood, N. J., Derby, England; St. Ouen sur Seine, France - SALES OFFICES AT: Detroit, Hastings, Mich.; New York, Rochester, N. Y.; Cleveland, Dayton, Toledo, Salem, Ohioq Philadelphia, Pittsburgh, Pa.; Chicago, Ill; New Haven, Conn.; Windsor, Ont.



BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY

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SCALING & LIGHT CHIPPING HAMMERS

DALLETT presents a complete line of precision made Scaling and Light Chipping Hammers: In high speed, valveless, and light, powerful coin-valve types.

ALL feature the DALLETT Safety Chinel Retainer Bushing-designed by DALLETT to hold the chisel securely, preventing piston from driving it out of hammer.

DALLETT'S KA Series: Lever or Handle trigger throttle valve control. Coin-valve type Hammer developed for light chipping, removing fins and sand from castings and for general scaling.

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> DALLETT'S RS Seriest Valveless type. Lever throttle control adi





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Manufacturers of Pneumatic Tools and Accessories



SKIL Tools

For top production ... at lewest costs ... poi SKIL Toolst They're packed with fast-working pawer ... built with longlasting stemies. Ask year Disferbuter to domonstrate SKIL Tools today?



A size and type for every job from lightest production drilling to heaviest boring, reaming and hole-cutting. 33 powerful models.

SKIL Belt Sunder



Speed all surfacing on flat surfaces of wood, steel and compositions. Belt widths from 2 1/4 to 4 1/2 inches. 4 powerful models.

SKIL Bench Grinders



Completely new line of powerful, fast-working grinders to baast production grinding, sharpening, wire-brushing and buffing. 4 madels.

Whatever the material . . . whatever the job SKIL Drills are the perfect answer to all drilling problems. They drive bits fast and clean through wood, steel or compositions. They put down more holes per hour on production, installation, rapair and maintenance work. And SKIL Drills save you time and mency at every turn.

SKIT. Drills are light, compact, perfectly belanced. They handle easily even in the fightest carners . . . end stand up longer under the roughest use.

Call your SKIL Tool Distributor for a domonstration. Get SKIL Drill today!

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OVER 80,000 SPROCKETS IN STOCK

It is rare when the almost endless types of Cullman sprockets in stock fail to immediately meet your transmission requirements. But if it SHOULD happen, Cullman's exclusive methods and specialized equipment will quickly produce specials for practically every sprocket need no matter how complicated.

Cullman's long years of specialized experience and fast, low-cost, high-precision production methods assures the best possible source of supply for standard or replacement sprockets.

CULLMAN WHEEL COMPANY

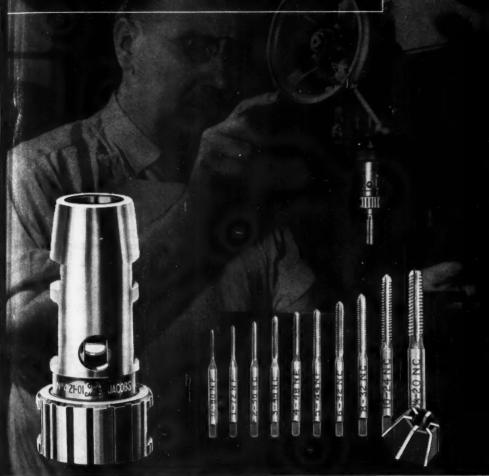
1352 V. West Altgeld St., Chicago 14, Ill.

Get Helpful Information

A particularly valuable Cullman catalog on sprockets and chains carried in stock, as well as illustrations, engineering data and borsepower tables applicable to power transmission, is yours for the asking. Suggestions and costs gladly furnished without obligation, upon receipt of blueprints or sketches.



PROCKETS . SPEED REDUCERS . CHAIN DRIVES . FLEXIBLE COUPLINGS 10 Taps...but only one Chuck!



Collet changing is a thing of the past when a Jacobs Rubber-Flex Tap Chuck holds the tool. One chuck takes all the taps in its range without the necessity of changing sleeves or collets! The Jacobs No. 421-01 Tap Chuck, for example, has a capacity from #0 machine screw taps to ½" hand taps. Light in weight and small

Light in weight and small in diameter, Jacobs Tap Chucks are designed to keep spindle inertia to a minimum. Rugged floating back jaws provide a sturdy positive drive. The Rubber-Flex Collet with its parallel bite provides the centralizing mechanism assuring extreme accuracy. External dimensions are ground and the internal bearing surfaces are precision bored. And tap changing is simplified—a quarter turn of the cap and the jaw screw disengages the tap from the chuck.

Stocked by your Industrial Supply Distributor. The Jacobs Manufacturing Co., Hartford 2, Connecticut.

If it's a JACOBS, it holds



Jacobs Chucks

Send for Bulletin No. 44 describing these

2 NEW VISES





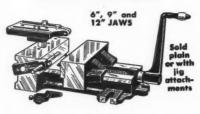
SWIVEL-BASE

CENTERING

Finely and accurately made. Unique ADJUSTABLE ZERO POINTER. Vise removable from base, to use plain. Screw never protrudes under work, cannot be drilled into. Usable with Jig Attachments.

MULTI-PURPOSE

Centers work regardless of size variations, as both jaws move toward center. This gives double-fast action. Handle fits on either end.



The famous Graham Vise that saves so much toolmaking cost by its special attachments. Three sizes to 124 lbs. for shaper, planer, drill press, radial, miller, grinder.

"ADJUST-ANGLE" KNURL HOLDER

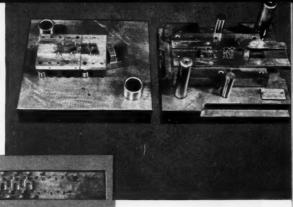
Straight Knurls Cut Many Patterns

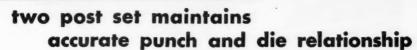


With shank made to fit your turret or tailstock, this Holder knurls work up to 21/2" dia. with a variety of patterns using only straight knurls.

GRAHAM MFG. CO., 30 Bridge St., East Greenwich, R. I.

10,800 Stampings per hour using DANLY Precision Die Set





save (

USE DANLY NATION-WIDE
DIE SET ASSEMBLY SERVICE

Use Darrly's specialized service to save time and money. Assembly plants listed below (marked with stars) stock interchangeable parts for quick assembly and delivery of any standard die set to suit your specifications.

- * Chicago 50, 2100 S 52nd Ave.
- * Cleveland 14, 1550 E. 33rd St.
- * Dayton 2, 990 E. Monument Ave.
- * Detroit 16, 1549 Temple Ave.
- * Grand Rapids, 113 Michigan St., N.W
- * Long Island City 1, 47-28 37th St. * Los Angeles 54, Ducommun Metals &
- Supply Co., 4890 S Alameda
- Milwaukee 2, 111 E. Wisconsin Ave.
- Philadelphia 44, 18 W. Chelten Ave.
- * Rochester 4, 16 Commercial St.

This 9-station progressive die setup produces two small offset brackets at a time from AISI-1008 steel strip stock 1%"x.071" at a press speed of 90 strokes per minute. The press delivers a gross production of 10,800 pieces per hour. A Danly all-steel two-post precision die set maintains tolerances of + .002" on the depth of the offset. Depth of embossing is held to .005".

250,000 pieces per die grind

On a total production of 750,000 pieces, an average of 125,000 strokes or 250,000 parts has been obtained per die grind. The precision built into Danly Die Sets (leader pins and bushings are held to limits of .0002 of an inch) helps you obtain a longer die life and lower stamping costs. Get top performance—specify Danly Precision Die Sets for every job. They're available for any type of press operation.

OPERATION CHART

CUT-OFF IDLE FORM IDLE NOTCH NOTCH PIERCE IDLE EMBOSS

Note: Shaded holes show pilot positions.

Write for this free bulletin

Illustrates how Danly Service on special die se:s can save you time and money.



DANLY MACHINE SPECIALTIES, INC.









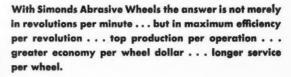


25 TEARS OF DEPENDABLE SERVICE TO THE STAMPING INDUSTRY

PRESISION BUT SETS, STANDARD AND SPECIAL - RECHANGED PRESISE AND PRESS EDUCATED



How fast is fast?

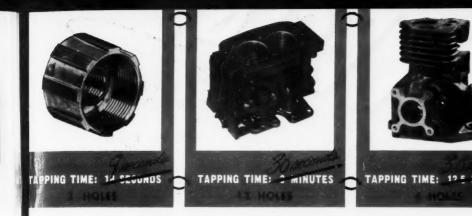


The answer also lies in selective scope and availability—and Simonds Abrasive offers you both—a line of grinding wheels in every desired combination of grain, grade and size, plus a distributor service constantly geared to your requirements.

Let's send you the name of your nearby distributor and a copy of our Data Book describing Simonds Abrasive Company's complete line.



SIMONDS ABRASIVE COMPANY, PHILADELPHIA 37, PA. DISTRIBUTORS IN PRINCIPAL CITIES





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Are there any economies like these in your tapping operations?

These are typical examples of production tapping economies Cleveland users are enjoying.

Cleveland's lead-screw feed and precision depth control, in combination with automatic cycling and engineered feed devices, permit single and multiple hole production tapping—even on class 3 and 4 fits—at speeds never before considered possible.

If your product must be tapped—one hole or a score—there is every possibility Cleveland engineers can find a way to do the job with similar savings.

Why not send sample parts or blueprints for their study and recommendations? Address The Cleveland Tapping Machine Company, Hartville, Ohio.

> CLEVELAND Sead ecrewitapping machines



An almost endless range of difficult requirements can be met by M & M circular cut-off machines. Special models are being built to handle practically any material, ferrous or non-ferrous; round, square or structural . . . always with Triple-Chip advantages: faster feeds and record-breaking speeds; clean, square, accurate lengths without bur; longer blade and tool life. Also, Motch & Merryweather is building special "many-in-one" models which combine cutting off with threading, center drilling, reaming, facing, chamfering and turning. Our technical staff will be glad to design a combination machine for you which will pay for itself and go on to show a handsome profit in 1949.



Only
N & TH builds
ALL 3:
CIRCULAR SAW
SAW BLADE
BLADE GEINGE

What, sir, are your requirements? We will give them prompt attention.

PENTON BUILDING

MERRYWEATHER MACHINERY CO



BURRING • FINISHING CLEANING • POLISHING



Brightboy

Figure time and costs on your separate burring, finishing, cleaning and polishing operations. See how much extra profit you can make by using rubber-cushioned Brightboy, which merges all four steps, including close tolerance, precision work, into one, time-saving operation.

Write the Brightboy Service Department regarding special methods setups, work procedure recommendations, hard-to-crack jobs. Askyour dealer to give you Brightboy prices, and the Catalog-Manual containing full information.

Simultaneous BURRING • FINISHING • CLEANING • POLISHING



The Soft Rubber Binder Cushions The Abrasive

BRIGHTBOY INDUSTRIAL DIVISION

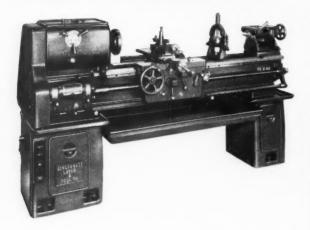
Weldon Roberts Rubber Co., Newark 7, N. J.

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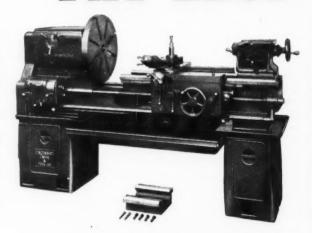
GET MORE



Lightweight Champ: The new Tray-Top Line of light duty geared head engine lathes (10", 12½", and 18" swing sizes) offer many "high price" lathe features at truly low cost: 12 spindle speeds, selected by color-coded dial, 48 thread and feed changes, exceptionally large spindles, anti-friction bearings, doublewalled apron, totally enclosed quick change gear box, many others. Distance between centers from 18" to 60".

PAY LESS

All This-And Gap, Too: 15" and 18" Tray - Tops furnished with gap, give you 22" and 25" swings over gap. Carriage has short wings on headstock and for maximum approach of tool, wings on tailstocks are extended for maximum rigidity and adequate bearing surface on bed. Like regular Tray-Top, distance between centers from 18" to 60", in increments of 6". All furnished with regular lathe attachments and accessories.



CINCINNATI LATHE & TOOL CO.

cintilathe

"ARBOR PRESS" IN NAME ONLY!



FRONTIER BRONZE CORPORATION
SPEEDS MANUFACTURE OF NEW
ALUMINUM PIPE WRENCH WITH
KRW MOTOR-DRIVEN
ARBOR PRESS

Marie Like

SEE HOW A LITTLE INGENUITY SAVES

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ed ed lly icenar is-

49

A LOT OF MONEY! A special coining die used in this standard KRW 50-ton motor-driven arbor press removes burrs which result from normal manufacturing procedure. A simple operation which eliminates the need of costly grinding and assures a free-running, tight fitting, adjusting nut. This new wrench weighs 60% less than conventional types yet withstands the same tests.

THE CONVENTIONAL ARBOR PRESS has come a long way in the past few years. From such every day tasks as straightening and bending, it has grown into a full size production tool. Today — because of their low initial and operating cost — you'll find KRW Arbor Presses doing hundreds of manufacturing operations in all sorts of plants. A little ingenuity, combined with simple, inexpensive dies can save you money by releasing heavier, more expensive equipment for larger work.

KRW Hydraulic Arbor Presses are available in varying sizes and tonnages, either hand-operated, air-operated or motor-driven. Tell us your needs... we are fully equipped to advise and engineer presses to do your particular job. Deliveries on standard presses within 10 days.

NEW KRW 100-Ton Blanking, Forming, Stamping Press
Batteries of these New KRW Presses are now in use in many
manufacturing plants doing all manner of work hitherto handled
on presses whose installation costs are higher than the total
cost of these revolutionary KRW Presses. Write for literature.

NAME YOUR NEEDS! MAIL COUPON TODAY!

K·R·WILSON

MAIN ST. BUFFALO 3. N. Y

VERSATILE · ADAPTABLE · LOW COSTI

• KRW Arbor Presses can be furnished for either vertical or horizontal ram travel. Distance between uprights can vary from 1 foot to 7 or better, daylight from inches to 6 feet and more. Even these specifications can be increased with minor changes and little cost. Investigate, use the coupon.

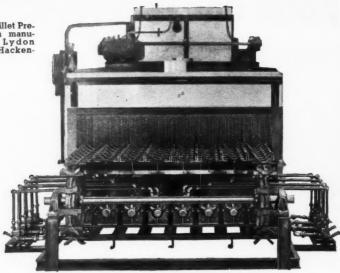
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Please send	me complete information on KRW Arbor Presses
	100-ton Hydraulic Presses [

Warne	
Name	

City and Zone.....State.....

End view of Billet Pre-Heating Oven manufactured by Lydon Bros., Inc., Hackensack, N.J.





8 Model R Foot Valves, with spring return, permit moving conveyor chains any distance up to 30".



NOPAK Model A Air Cylinders like this, with 30" strokes, are used on the Lydon Bros. Oven.

Conveyor Chains on **Pre-Heating Ovens are** Powered by NOPAK...

Lydon Bros., Inc., Hackensack, N. J. . . . designers and manufacturers of industrial ovens and dryers . . . employ 8 NOPAK Model A Air Cylinders controlled by 8 NOPAK Model R Foot Valves in this Billet Pre-heating Oven, to actuate the conveyor chains which feed billets into the oven.

Each of the 6" cylinders has a 30" stroke, and is ratchet coupled to one of the conveyor chains. Thus each chain is operated independently, and may be advanced any distance up to 30" with each depression of foot valve pedal. This makes the conveyor system both flexible and selective, an important advantage in this particular case . . . Possibly a similar application of NOPAK Valves and Cylinders can help pull one of your design or production "chestnuts" out of the fire.

GALLAND-HENNING MFG. CO.

2758 SOUTH 31st STREET MILWAUKEE 7, WISCONSIN



A 5528-1/2 I-A

Helping Hand

in Precision Hardness Testing



WILSON has maintained in the past and continues to maintain a staff of Field Service Engineers who are responsible hardness testing specialists. Their responsibility is to (1) study users' hardness testing requirements, (2) recommend the equipment that will serve best, (3) see that it is correctly

installed and (4) make sure that it continues to give dependable service.

We are originators and exclusive manufacturers of "ROCKWELL" Hardness Testers, "ROCKWELL" Superficial and TUKON Microhardness Testers. Our years of concentration on developing and improving hardness testing equipment give our factory-trained representatives the necessary background for the best possible service to you.



BRALE is the only diamond indenter made to Wilson's precision standards for use on "ROCK-WELL" Hardness Testers and "ROCKWELL" Superficial Hardness Testers.

WILSON

MECHANICAL INSTRUMENT CO., INC.

AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

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Write for your personal copy of Catalog A-50...60 pages of exceptional tool values...yours for the asking.

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BIGGER
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VALUE
and
BETTER
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PERFORMANCE



"SUPERSOCKETS"



OPTH END, BOX, ADJUSTABLE AND RATCHET WRENCHES, DETACHABLE SOCKETS AND SETS; IMPACT SOCKETS, FOOL HOEDERS, LATHE BOBS, "C" CLAIMPS, CHAMPIPE TONGS AND VISES; FLANGE JACKS, PLIERS, SCREWBEIVERS, PUNCHES AND CHISELS, SOFT FACED "MUPLAFLEX" TIPPED HAMMERS, MORT MOODS, EVE BOLTS, ROD LINES, CHAME AND BALANCE HAMDERS, THUMB SCREWS AND HUIS.

J. H. WILLIAMS & CO., BUFFALO 7, N. Y. Distributors Everywhere



With this new accessory, the operator of a Taft-Peirce 6" Rotary Surface Grinder can accurately gage—as he grinds—the amount of stock that has been removed from the work face. Removal of the work for band gaging is completely eliminated. Production is

doubled, even tripled, and spoilage drastically reduced.

Taft-Peirce 6" Rotary Surface Grinder

Before starting a production run, a master setting gage is used to set the nozzle and dial pointer of a specially equipped Taft-Peirce CompAIRator Air Gage. From then on the nozzle arm is merely swung over the work surface, as each new piece is inserted, and adjusted to the selected dial reading. While grinding, the operator merely watches the pointer until it indicates that the required amount of stock has been removed Coolant flow does not affect gaging accuracy.

The T-P CompAIRator Air Gage can be applied to other machine tools, too. And on the inspection bench, it is the ideal air gage for precision checking.

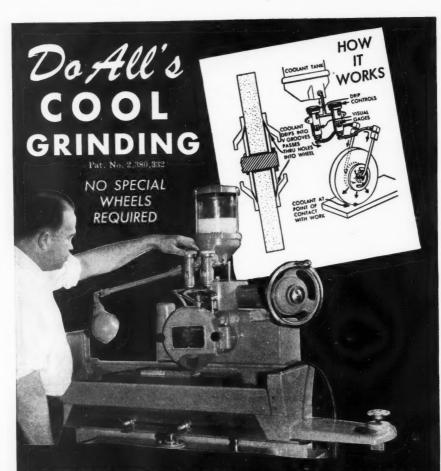
For additional information about this unusual gage and accessory, write to:

THE TAFT-PEIRCE MANUFACTURING COMPANY, WOOMSOCKET, RHODE ISLAND

T-P means TOP PRECISION



For hard-10-grind-jobs this versatile 6" Rotary Surface Grinder has a flexibility that practically eliminates complex set-ups. Work spindle swivels 7½; exclusive Titleng Wheelboad swivels from horizontal to 30" below wheel center. Write for circular.



DoALL's exclusive Cool Grinding Unit on precision surface grinders produces better finish, requires fewer wheel dressings and assures longer wheel life. Keeps the work as cool as any coolant and gives better work visibility. Eliminates the need of coolant pumps and dust collectors for most work. Minimizes cracking, skin softness and warping. Secret of this new process is that coolant passes right through the wheel — fed into wheel near center and drawn to edge by centrifugal force as shown in above drawing. DoALL Precision Surface Grinders — 6 models — are hydraulically operated. Write for data.

The

DoALL Co. DES PLAINES, ILL.



EMERGENCIES LIKE THIS NEED NOT HAPPEN.



... not if your Union Drawn Distributor is your production partner. Need a steel bar or length of shafting . . . to stave off a temporary shutdown? Pick up your phone and call

His entire organization is geared to emer-

gency service; and his stock is complete, diversified and classified for quick and accurate handling. From the moment you pick

up your telephone to the arrival of the order at your receiving dock-it is usually only a matter of minutes.

But prevention is far better than cure. These emergencies rarely happen-when you make full use of the Union Drawn Distributor's inventory as your normal supply line. Phone him today and ask him how you can share his stockpile - as

much as you need, when you need it.

UNION COLD DRAWN STEELS

HERE'S HOW

T-J SAVES LABOR

ON THOUSANDS OF JOBS FOR INDUSTRY!



T-J HYDRAULIC CYLINDERS simplify machines . . . save time and labor on jobs where pushing, pulling or lifting is needed... 100 lb. or 50,000 lb. Shown here—a shell loading press with T-J Cylinders

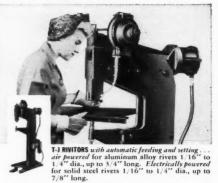




T-J AIR CYLINDERS do push-pull-lift jobs . . . 100 lb. to 12,000 lb. ... wide range of styles, sizes and strokes. Shown here - Auto-matic Drilling and Threading Machine with T-J Cylinders.







T-J AIR CONTROLS provide accurate, automatic control for presses, brakes, other machines and equipment . . . designed for air cylinders in semiautomatic or automatic cycles.

products. foot pedal.



The Tomkins-Johnson Co. Jackson, Michigan



Fully automatic-controlled



T-J CUTTERS for more work between grinds in tough die steels . . . accurate . . . sturdy . . . less breakage. All standard types and

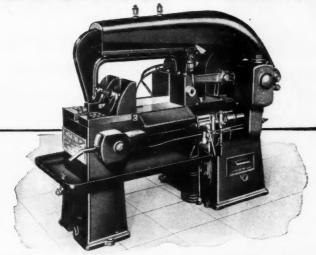


TOMKINS-JOHNSON THE AIR AND HYDRAULIE CYLINDERS CUTTERS CLINCHORS

32 YEARS EXPERIENCE

RACINE metal cutting

machines



SIMPLE • RUGGED • DEPENDABLE

Cut every class of bar stock in sizes to 20" x 20" with RACINE Machines. All models_incorporate hydraulic operation and control. This means simple design, few working parts and a very minimum of maintenance expense.

Oil cushioned feeds protect the blade against the undue strains that cause flexing, crooked cutting and short blade life.

RACINE Machines are available for tool-room and maintenance cutting as well as heavy duty work. Automatic bar feed units develop unexpected savings in the cutting of multiple pieces. All are accurate, economical and long-lived.

Write today for free recommendations on the metal-cutting jobs in your shop. RACINE TOOL and MACHINE CO., 1770 State St., Racine, Wisconsin.



Standard for Quality and Precision

RACINE OIL HYDRAULIC PUMPS AND VALVES



Featuring Variable Vol-ume Oil Hydraulic Pumps and four-way Hydraulic Valves in a variety of types and sizes. Pumps up to 30 g.p.m. at 3000 p.s.i. Valves from 3/8" to 11/2" I.P.S. Ask for Catalog No. P-10-C.





MECHANICAL FLEXIBLE POWER STRAIGHTENING PRESSES

G-F-P PRESS and STRAIGHTENING ATTACHMENT

> reports a midwestern steel treating company. Similar reports come from others.

1200 per press in 8 hours is the rate set for rough straightening transmission shafts on Flexible Presses. This is many more than were done on punch presses which required skilled operators, larger presses, and more maintenance cost.

Straightening on Flexible Presses like all production operations is always speeded up on equipment engineered especially for certain work. • Write for bulletins 376 and 378.

No. 106 General Flexible Power Press, 15-ton Capacity, with No. 76 Lock Lever Center Straightening Attachment.

GENERAL MANUFACTURING CO.

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A NEW DESIGN . . . for better tapping The SCHRILLO

- Taps straight square holes.
- Eliminates costly errors.
- A Tool and Die makers essential.

The Schrillo Pilot Tap has been designed around the requirements of the tool and die maker with emphasis placed upon its time and money saving features. The Pilot tap has an integral guide which automatically positions itself in a previously drilled hole. All danger of torn or misaligned threads is eliminated-a very important consideration when expensive dies and castings are concerned.

CHRILLO

The Schrillo Pilot Taps are of H. S. Steel in NC series. Size range 1/4 to 1/2 inclusive at popular competitive prices.

Quotations on Special taps, Cutting tools and

WRITE for catalogue No. 14 (on company letterhead, please). It is a complete hand book compiled for the designer, purchaser and user of taps and tapping equipment.

CHRILLO

PILOT TAP

- Saves time and money.
- No tapping aids necessary.
- A perfect maintenance tool.

Gages given on request. Consult our local representative for prompt and courteous service.

ATTENTION PLEASE! For production tapping of heat treated, high tensile alloy steel a special surface treatment has been developed after painstaking research. Tests in the field on alloy steels heat treated to Rockwell 40 C Scale have produced admirable results. For further data

on "Armourclad" process write to the factory.

TOOL AND DIEMAKER **KIT NO. 47**

All the necessary tools for positioning the 1/4, 5/16, 3/8, 7/16 and 1/2 inch Socket Head and Filister Head cap screws are conveniently boxed in an attractive kit with Standard Schrillo Counterbores and removable pilot guides. All tools are of high speed steel and carry the Schrillo guarantee against any defects in ma-terial and workmanship.





SERIES 1700—Two models: with chamber sizes 8½" W, 7½" H, 13½" D or 8½" W, 7½" H, 13½" D or 8½" W, 7½" H, 18" D. Both for 230-volt operation. Prices—\$250.00 to \$405.00 complete with controls.



SERIES 1600

Two models: with chamber sizes 5" W, 4 ½" H, 9" D and 5" W, 4½ H, 13½" D. 115 or 230-volt operation. Prices—\$140.00 to \$280.00 complete with controls.



SERIES 1500

—Two models: with chamber sizes 4"
W, 3½" H, 4½"
D and 4" W, 3½"
H, 9" D. 115 or 230-volt operation.
Prices—\$87.50 to \$107.50 complete with stepless control.

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FOR HEAT TREATING TOOLS, DIES, PARTS AND GENERAL LABORATORY WORK

Do your own heat treating...right in your own plant or shop... save time and costs, eliminate sending work "outside". Investigate this rugged entirely new TEMCO line today...welded steel construction, heavy dual insulation! Fast-heating and can be operated continously up to 1650° F., intermittently to 1900° F. Use for hardening and tempering of tools, dies, parts and small unit production. Ideal, too, for lab testing and process control. Write today for data and your nearest dealer's name.

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Bearing performance becomes a reality when you use the Norma-Hoffmann "Cartridge" Bearing in your products. This double-row width bearing has 100% greater grease capacity than conventional bearings. The highly efficient seals lock grease in . . . keep dirt out. Carefully factory-packed with Norma-Hoffmann's specially compounded grease assures high antifriction performance for years on end. These are but a few of the reasons why the Norma-Hoffmann''Cartridge'' Bearing is "America's No. 1 Sealed Bearing."

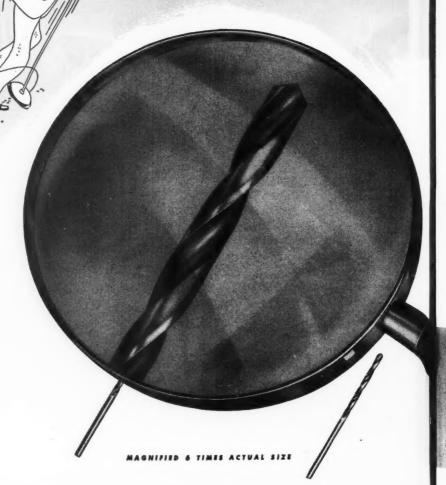
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AMERICA'S NO. 1 SEALED BEARING

NORMA-HOFFMANN BEARINGS CORP.
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Announcing Big MORSE Cash Contest!



FIOOOPPRIZE FOR THE BEST NAME for this NEW MORSE DRILL

AND 5 OTHER VALUABLE PRIZES

TERMS OF THE CONTEST

First Prize\$1,000.00 cash	1. This contest does not cost you a cent, nothing but a little time and thought. No forms to fill out, either. Just typewrite
Second Prize\$200.00 cash	your suggestions on a sheet of white paper the size of this page (smaller sizes might get lost) and write your name and address.
Third Prize\$50.00 cash	 There's no limit to the number of names you can send in. Any person residing in the continental U.S. may submit en-
Fourth Prize Set of 4 dozen drills,	tries—except employees and the families of employees of Morse Twist Drill & Machine Co., and its advertising agency.

Twist Drill & Machine Co., and its advertising agency. any size you want. 4. In case of duplication of winning name, duplicate prizes will be awarded.

5. No entries can be returned, and all entries become the sole property of Morse Twist Drill & Machine Co. 6. Entries must be postmarked not later than midnight, March

7. The decision of the judges will be final.

Address all entries to: NEW NAME CONTEST, Morse Twist Drill & Machine Co., New Bedford, Mass.

NOW IN YOUR INDUSTRIAL SUPPLY DISTRIBUTOR'S STOCK WINNERS WILL BE ANNOUNCED IN THE MAY ISSUE OF THIS AND OTHER INDUSTRIAL MAGAZINES WATCH FOR THEM!

. Set of 2 dozen drills,

any size you want.

Set of 1 dozen drills,

any size you want.

FEATURES OF NEW MORSE DRILL: This new gold-colored Morse Drill delivers 50% more production, on multi-spindle automatic machines. This longer life comes from greater toughness and flexibility . . . and guarantees substantial savings because of far fewer drill-changeovers.

Here is a completely new drill . . . ground from the solid, with heavier web, increased twist, and wider

flutes that clear chips through hole and jig bushing in a fast easy flow. But here's the final payoff: Morse has added something new to drill manufacture ... an extra, exclusive process that gives this drill more strength -more plain fighting guts to withstand higher speedsthan any other drill. This has been proved by thorough field tests. 58 sizes, from No. 80 to 1/4", are now available through Morse-Franchised Distributors.

SOLD EXCLUSIVELY THROUGH MORSE-FRANCHISED DIS

DIVISION OF VAN NORMAN COMPAN

BRANCH WAREHOUSES: NEW YORK, DETROIT, CHICAGO, SAN FRANCISCO

Fifth Prize ...

Sixth Prize ...



SHOWN above, is one of many unusual parallel-surfacing jobs performed by the high-production "feedthru" method — on GARDNER Double GRINDERS.



Use Modern GARDNER WIRE-LOKT Abrasives on YOUR Disc Grinders!

Here, plane blades are fed to rubber rolls that guide them between opposed grinding wheels, where TWO sides are parallel-surfaced at ONE pass thru the machine. Food chopper blades also are fed thru this machine, on the same fixture, at the rate of 20 per minute.

For faster, lower-cost parallel-surfacing, investigate the advantages of GARDNER Double GRINDING.

WORK DATA

Part Plane Blades

Material Steel

Operation Strind Two Parallel Sides

Tolerances Clean Up to Uniform Thickness

Stock Removal

Production 4 to 6 Pieces Per Minute

4 to 6 Pieces Ver Minute Feed Hand Load to Rubber Feed Rolls

Machine No. 125 - 26" Bardner Double Brinder

Bardner Double Arinder

GARDNER-GRIND YOUR Flat SURFACES WRITE FOR OUR Double Grinder BULLETINI

GARDNER MACHINE COMPANY
428 East Gardner Street *** ** Beloit, Wisconsin, U.S.A.



Bulletin

*Patents Pending

specify Chromium Plated DuBo Gages.

For long runs and the more abrasive materials

Simply tip handle slightly above bore oxis. Enters even un-dersized bores easily, DEFINITE CHECK

Whether or not handle drops freely below center is definite yes-orno answer.

GAGING SURFACES are portions of a sphere

STANDARD GAGE CO., Inc. Poughkeepsie, N.Y.

LIGHT IN WEIGHT

DuBo Gages weigh 70% to 80% less

than cylindrical plug

gages of equivalent

WHYTE-

ENGINEERING CO.

WHYTE ROLL FEEDS

for Fast, Accurate Continuous Feeding

- STOCK MODELS AVAILABLE TO FEED FROM 0" TO 12" AND UP TO 14" WIDE
- LARGER MODELS ON REQUEST
- RUGGED WELDED STEEL CONSTRUCTION
- TIMKEN ROLLER BEARINGS
- ALL CUT STEEL GEARS
- EASILY ADJUSTED TO PROPER DIE HEIGHT
- SINGLE AND DUAL FEED AVAILABLE
- ALL FEEDS WITH 2 ROLL LIFTS, AUTO-MATIC AND MANUAL FOR CONVENIENT LOADING OF STOCK

Immediate Delivery

WHYTE

ENGINEERING CO.

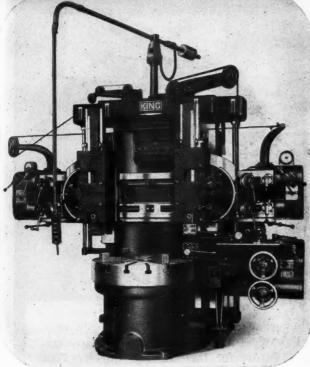
SPRINGFIELD 7, MASS

Write for Detailed Illustrated Literature



Lamination Dies
Dial Feeds
Slide Feeds
Pick-Off Attachments
Stock Straighteners

The New Series KING



- meets close tolerances
- maintains accuracy
- e reduces costs

The New Series KING Vertical Boring and Turning Machine is easy to operate.

For example, angular hand adjustment levers with micrometer dials for vertical and horizontal movement of the head are an integral part of the head and move with it. They enable the operator to make precision adjustments easily and quickly from his normal working position.

The massive rectangular type ram heads
. . . the ram heads square locked and

fitted with four tapered gibs for accurate adjustment . . . the heavy tie plate across the swivel . . . all assure high and consistent accuracy.

These features plus full range of feeds and speeds make possible maximum production at exceptionally low costs.

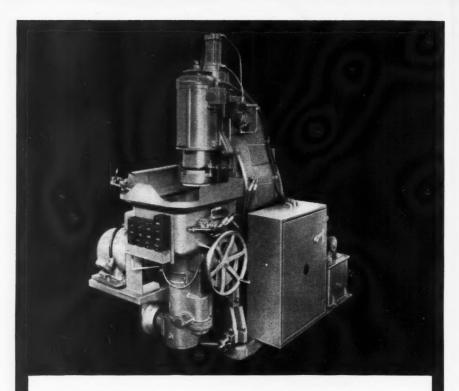
Consult a King Engineer on your precision turning, boring, facing, taper turning, and similar operations.

Ten sizes available, from 30" to 144"

American Steel Foundries

KING MACHINE TOOL DIVISION

CINCINNATI 29, OHIO



Walker High Production Vertical Stroke Grinder—the only Grinder of its kind and does not compete with other Grinders. Specially designed primarily for the Saw and Circular Tool Industry.

Can grind flats-convex-concave and bevels to 15 degrees.

Has clearance of 8" hubs and can grind to a combination of radii giving a parabolic curvature.

Electric controlled — hydraulic feed — rapid traverse.

O. S. WALKER CO.Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

THE CASE OF THE FORTUNATE FOUNDRY

Finds a
28% boost
in finish
arinding
air scoop flaps
with



METALITE* CLOTH BELTS

GET THE COMPLETE SERIES

Our booklet "Production Telks Backstands" gives you a whole series of similar case histories with convincing facts and figures. Write for your copy today.



* Reg. U. S. Pat. Of

When this shop converted from set-up wheels to the belt backstand method, interruptions in production were cut 'way down, one METALITE Cloth Belt outlasting four set-up wheels, permitting almost constant production, with time-out for belt change only one minute. The operation was finish grinding the outside edges of air scoop flaps—magnesium castings. DURABONDED METALITE Cloth Belts, #50-X grit, 2" x 118", were used over soft contact wheels, 16" x 2" x 11/4" rough edge—belt speed, 8500 SFPM. Output jumped to 60 per hour—28% over the set-up wheel method formerly used, finish was better and costs were cut substantially.

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Timken Zero Precision Bearings are by far the most accurate tapered roller bearings that can be made in regular commercial production. Runout or eccentricity is restricted to less than .00015 of an inch. Cups and cones of Timken Zero Precision Bearings are matched and shipped as a complete unit.

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76

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TUESDAY

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12 pieces 6" Standard Steel Pipe

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LATHE CATALOGS

CATALOG 100-G describes Quick Change Gear and Toolroom Lathes with 9", 10", 13", 141/2", 16" and 16/24" swings; Precision Turret Lathes with 1/2" and 1" collet capacities -9", 10" and 16" swings; Attachments. Accessories and Tools.

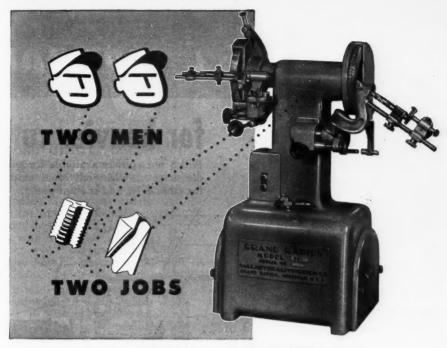
CATALOG 9-F describes Quick Change Gear, Plain Change Gear and Toolroom Lathes with 9" swing; Precision Turret Lathes with 1/2" collet capacity -9" swing; Attachments, Accessories, Tools for 9"lathes.

CATALOG 73 describes the new 13" and 141/2" Ouick Change Gear and Toolroom Lathes with 1" collet capacity; also Attachments, Accessories and Tools that can be used with them.

CATALOG 77-U describes Attachments, Accessories and Tools available for all sizes and types of South Bend Lathes. Many of them are readily adaptable for use with other makes of lathes.

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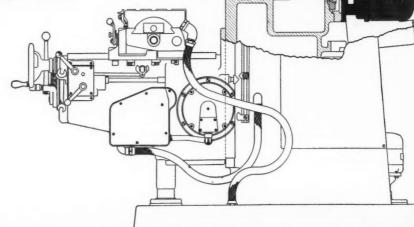
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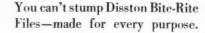


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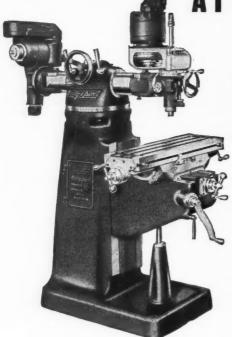
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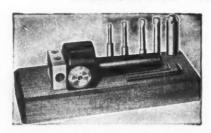


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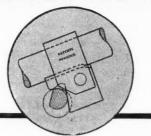
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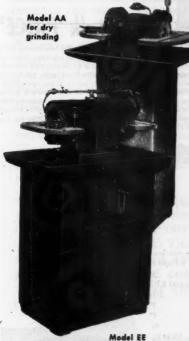
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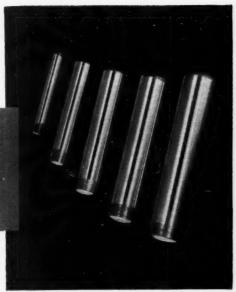
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On the new "AMERICAN" Hole Wizard Radial the arm girdle and its mating column area are automatically oiled and cleansed.

Actuation of the elevating lever operates a plunger pump in the arm girdle forcing oil into the distributing reservoir at the top which lubricates the entire arm girdle area. Abrasion and oil resistant synthetic wipers at top and bottom trap the oil to prevent leakage and thoroughly cleanse the column of all dirt and foreign matter ahead of the arm girdle when raised or lowered.

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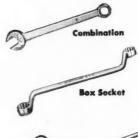
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Write for New S-48 Catalog just released.













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Machine Shop

FEBRUARY, 1949

Vol. 21, No. 9

CINCINNATI, OHIO

This Month

For our feature article this month we present an unusually interesting article on materials handling written by E. L. Bailey, Staff Electrical Engineer, Chrysler Corporation. Mr. Bailey describes the methods and equipment employed at Chrysler to coordinate the movement of two million ton-miles of manufacturing material within a single plant.

Mr. Bennett's second article on the subject of steel treating deals with the design of tools and dies, hard spots in annealed bars, furnaces and their applications, and a radically new method of treating molybdenum high speed steel. Page 112.

In discussing the basic issues involved in the consideration of Human Relations problems, Mr. Bird points out the importance of properly interviewing the job applicant, indoctrinating the new worker, and training the new worker for his job. Page 134.

On page 156 you will find the "Human Relations Forum," a section devoted to a series of questions submitted by the readers of Modern Machine Shop and answers supplied by our Human Relations Editor.

Progressive Die Design, Part XII, is devoted to a discussion of transfer feeds and particularly to a description of a five-station progressive die in which a transfer dial is used to provide two additional work stations. Page 166.

"New Beryllium Copper Molds" is a description of an economical molding process which features the combined application of hobbing, casting, and press forging operations. Frank Charity, author of the article, has supplied excellent illustrations of both the molds and the cast plastic workpieces for which the molds were designed. Page 174.

"Modern Equipment at Work," page 186, contains an unusually fine assortment of job stories which feature the application of new tools and equipment. Uses for a General Electric 200-amp. a.c. welder, a Sheffield automatic Airlectric gaging and classifying machine, Fostoria infrared heating lamps, and a Kent-Owens 2-20 milling machine are featured this month.

Five practical ideas submitted by readers will be found in the "Ideas from Readers." Page 198.

The "New Shop Equipment" section begins on page 226.

"User's Eye View" of Materials Handling at Chrysler*

The Author Tells How Chrysler Coordinates the Movement of Two Million Ton-Miles of Manufacturing Materials Within a Single Plant.

By E. L. BAILEY

Staff Electrical Engineer, Chrysler Corporation, Detroit, Michigan

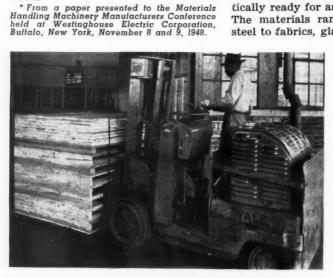
MATERIAL handling in the automotive industry is very similar to that of any other large manufacturing concern. It is decidedly big business to coordinate the movement of two million ton-miles of manufacturing material within a single plant. An examination of the general plan of production reveals some particular problems which I am sure will prove of in-

terest to all who are faced with material handling problems.

Our final product—an automobile running under its own power—is the end-result of manufacturing and assembling thousands of parts, of which many, such as the engine, are made completely in our plants from the raw materials. Other parts or sub-assemblies are received at our plants practically ready for assembly on the car. The materials range from iron and steel to fabrics, glass and rubber, and

each material, in the correct form and quantity, must be available at the final assembly line at the right time.

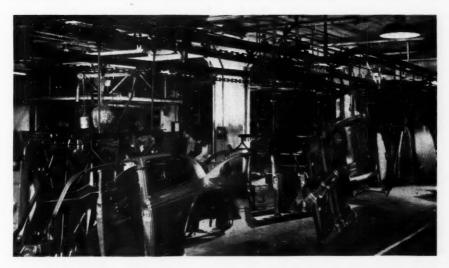
Materials received, either by rail or truck, are disposed to suitable storage areas where they will be on hand



Yale "Jitney" power shock truck being used to move a stack of pallets.

and ready to be added to the car in the final assembly. The more effective the planning for delivery of material to our plant from outside sources exactly as required, the smaller the space necessary for storage. Accordingly, great effort is made in our organization for planning the receipt of material according to a well-defined schedule.

for a suitable period of time; say onehalf day, can be stored on the conveyor, which, of course, is routed to make delivery of the parts at the proper point on the assembly line. The drive for such a conveyor is a simple one-speed unit designed to move the conveyor only fast enough for good unloading conditions.



Sub-assembly parts are hung on a motor-driven overhead chain conveyor which carries them to the departments where they will be assembled to the car.

Many types of electrically-operated devices such as cranes, hoists, conveyors and jitneys play a very important part in all of this material handling. As a freight car door is opened, either an electric jitney truck speeds into the car and picks up the skids or pallets of material or a group of men proceed to remove the parts by hand and hang them on a motor-driven continuously-moving chain conveyor. In either case, the car is quickly unloaded and the material removed to storage. In some cases, where the supply can be regulated to a nicety, the conveyor itself becomes the storage area.

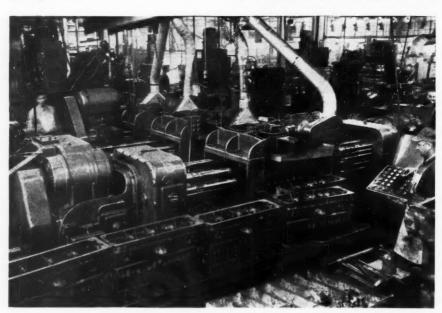
In that case the entire requirements

Heavy castings are moved by railroad car or truck from the foundry division to the machine shop, where all of the many machining operations are carried on. After being unloaded at the receiving platform, the castings move forward on a conveyor of the type that best suits the purpose, either roller, chain or slat, and usually electrically propelled. Heavy castings are never manually lifted. Where lifting is required, an electric hoist is located at the proper point and equipped with a special fixture which makes handling easy and accurate.

After an engine block casting has been machined, for example, it is placed on a final engine assembly conveyor. The conveyor is a form of continuous bench, on either side of which are located skids of parts which have been placed there for assembling at the right time and place. Some of the parts and sub-assemblies are brought to the engine assembly conveyor by other overhead chain conveyors, all of which are designed to deliver the material as required.

Each item of sub-assembly, such as the rear axle, the wheels and tires, the gas tank, the seats and the instrument board, is built in its own little manufacturing area. Even small parts are generally assembled on a conveyor of some sort, often either a continuous bench belt-type arrangement, a carousel or a series of stations along a conveyor line. The basis of manufacture is obviously an order for an automobile. This order, after proper editing, is sent to a point in the manufacturing unit where all of the important factors in the manufacturing program are coordinated under a centralized control. Here is installed a teletype or telautograph which is connected by wire to every principal assembly department so that the central control department can issue orders to everyone concerned regarding the specifications for each automobile.

Considering that automobile manufacturing is the outstanding example of mass production technique, this system may seem peculiar, but every automobile is somebody's pride and joy, and every effort should be made to make it distinctive. We don't often have requests for blue bodies with



Engine castings are moved from operation to operation upon roller conveyors. Where the distance between machines is too great for manual operation, the rollers are revolved by power. Electric hoists are located at all points where heavy castings must be lifted; no manual lifting is permitted.

pink wheels, but every one has some little distinctive feature, and there are thousands of variations. We have found that this scheme of scheduling the production far in advance and then scheduling the parts for a car on a certain order for a certain day is very satisfactory. This system has been effectively used since it permits few mistakes.

The system might be called a sequence routing plan. Approximately two weeks before construction on the car as-

sembly begins on an order, the chief dispatcher sets up his schedule for cars to be built that day. A sequence number is assigned to each order, beginning with No. 1 as the first car that is to be built that day, then No. 2, and so on. Each sub-assembly supervisor must then prepare, sometime during the next two weeks, the car parts for that particular run. Further, he must see that his orders follow on the conveyor in the proper sequence for that day and every day. By means of this control and the coordination of all conveyors the right material reaches the final assembly line at the right time and complete cars appear at the end of the final assembly on schedule.

An automobile assembly plant uses power to the amount of probably 300 kilowatts. Some of these plants take 12,000 to 15,000 kilowatts as their de-



Parts and assemblies are added to the frame assembly as it moves by power conveyor along the assembly line. Here a completed engine is being lowered into place in the frame.

mand, so you see that the assembly isn't the important thing. That is purely incidental. The essential point consists in getting the pieces there to assemble and having them right so that they will go to the right spot at the right time.

I have not said very much about electric control in this gigantic material-handling job. The user's choice is confined to what the market offers in reliable standard devices for this work and, accordingly, we have had to be satisfied with the mechanisms that are available. Out of the nearly one thousand conveyors of all types, sizes and kinds in our plants, only thirty are speed-controlled electrically. The reason is that there is no modestly-priced adjustable speed device that we have considered suitable.

Most of the conveyors have mechan-

ical speed adjustment, such as the Reeves Drive, which is seldom changed when once fixed. This drive, I beieve, has become almost standard in the automobile industry because any reliable single speed squirrel cage N.E.M.A. rated induction motor can

some special adaptations here and there, such as the body handling hoist. This hoist is a Monorail unit and is arranged so that the operator can pick up a body in a storage area and deliver it to the particular point where it is to be used.



Control room at Plymouth plant of Chrysler Corporation, from which schedules for building cars on the assembly lines are sent to 36 stations along the lines. A schedule card is issued for each car; the data on these cards makes it possible for the body, wheels, fenders, trim, and special equipment of the correct designs and colors to meet on the line at the proper place and in the proper sequence for correct assembly.

be used. We have tried every means possible to utilize standard induction type motors.

We use a great many other material handling devices besides conveyors; such as cranes, hoists and elevators. These together with our machine tools and other equipment are practically all powered with a.c. current. We use a.c. to save the necessity of maintaining a direct current source.

Our cranes and hoists are standard as furnished by the industry, with

In multi-story buildings the elevator program is still most important and involves several factors; notably, the choosing of the right elevator for the job, stressing the necessity for the strength of the elevator platform and the necessity for precision in leveling where the jitney with its small diameter wheels is used. Inasmuch as a jitney weighs six thousand pounds, it requires care in driving onto or from an elevator when pushing a small load ahead of it on the fork.

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Working two shifts, full time, this Cincinnati Shaper notches fourteen plow-bolt holes in these shear knives every five minutes.

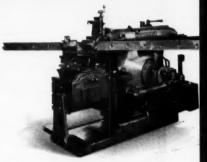
PRODUCTION

Shapers at The Ohio Knife Company are used strictly as manufacturing tools, for mitering, contour cutting, slotting, corrugating and beveling knife blades.

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COSTS

Write for Shaper Catalog N-3. It will help you determine the size and type of Cincinnati Shaper you need.

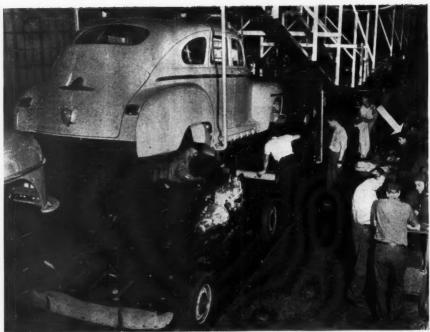


Knives are high carbon, high chrome steel. Cutting tool is high-speed steel. Shaper operates at 119 strokes per minute.

THE CINCINNATI SHAPER CO.

CINCINNATI 25. OHIO U.S.A. SHAPERS SHEARS BRAKES







(Above) In the Plymouth plant the body conveyor, which is overhead, moves downward to set the body on the frame at the correct spot for proper assembly. The conveyors are controlled by the operator indicated by the arrow.

(Left) Lowering grille and front fender assemly into place on frame. The storage is maintained on the floor above, and the assembly is dropped through an aperture in the ceiling.



Within their range, these highly productive, 9" column, 3 or 4-foot arm High-Speed All-Geared Super Service Radials give a high return on investment.

Write for detailed Bulletin R-21-B.

See our condensed catalog in Sweet's File.



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Model No. 131



A new member of the Chicago Press Brake family designed to supplement the larger machines.

Within its rated capacity (11 tons) all operations are handled same as on the larger machines.

All steel construction, enclosed gearing.

Takes up small floor space. We can make excellent deliveries of this new press.

We make complete line of dies for all Press Brakes.

Send for Bulletin 131 for further description

DREIS & KRUMP MFG. CO.

7418 LOOMIS BLVD. • CHICAGO 36

The jitney or the electrically-operated industrial truck is depended upon most for handling material in our plants. Power is supplied by either a storage battery or a gasoline engine driven generator. These trucks are now built in many forms especially adapted to stacking skids, tote boxes, and so on. They are much too heavy and weigh as much as they carry; still, they are the most versatile type of carrier we have.

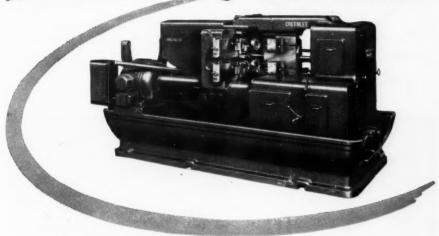
In conclusion, I want to impress you with the fact that material handling of thirteen thousand parts for every automobile we build, amounting to at least two million tons per year, presents a very challenging problem, and we look to the material-handling industry to study our problem with us in order to be able to furnish us with the very latest helps in economical material handling.

South Bend Precision Machine Tools. The South Bend Lathe Works, 427 E. Madison St., South Bend 22, Ind., now has available a 16-page two-color catalog presenting illustrated, descriptive, tabular information, including prices, on its complete line of lathes and attachments which comprises various sizes of quick change gear lathes, toolroom lathes, collet lathes, bench lathes, and turret lathes, collet attachments, collet racks and chests, collets and collet sets, chuck and tool assortments, milling and keyway cutting attachments, taper attachments, tool blocks, cross slides, bed turrets, carriage stops, standard and safety lathe dogs, lathe centers and drill pads, grinding attachments, undercutting attachments, adjustable collet bushing chucks, and so on. Also illustrated and briefly described is the company's 14-inch drill press and 7-inch bench shaper. Copy of Catalog No. 22 free upon request.

"Behind the Centerless Symbol," a four-page two-color folder published by The Heald Machine Co., Worcester 6, Mass., presents facts on how the new Heald Centerless Internals can simplify precision grinding. Outstanding features of the machines are clearly shown and described. Copy free upon request.

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built-in overarm lighting, identical tool cavities and tool holders, rapidly interchangeable crossslide cams, quick adjustment of the main tool slide stroke, built-in coolant system, quick-change feed and speed gears, and many other advantages for maximum set-up and operating efficiency.

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KINGSTON-CONLEY ELECTRIC CO.







Photo, above right: Turning motor shafts on standard 20" Power Feed Drill Presses.

Photo, upper left: Spinning insulation fibre bushings over steel motor bands with 15"

Drill Press.

Photo, lower left: Balancing motor rotors with 15" Drill Press. Depth Gauge Indicator shows amount of metal to be removed for correct dynamic balance.

*Photo, upper right: 20" Power Feed Drill Head, Model D-1101X. 4 ball bearings, 6" spindle travel. Five standard spindle speeds, 400 to 2600 r.p.m. with 1740 r.p.m. motor. Capacity 1" in cast iron, 34" in steel. Slo-speed motor optional.

110



Demands for increased production on turning motor and grinder shafts at Kingston-Conley Electric Co., North Plainfield, N. J., necessitated

replanning production equipment and methods.

Replacing five lathes with five Walker-Turner 20" Power Feed Drill Presses each equipped with a molybdenum high speed box tool containing three separate bits held with set screws and a Jacobs Chuck on each spindle, three shaft diameters are now turned in a single operation. Power feed controls on Drill Heads feed the work into box tools at .003" to .009" per spindle revolution. Accuracy is kept at .004" tolerance. Results: production tripled; man-hour costs halved.

Taking further advantage of the broad adaptability of Walker-Turner Machine Tools, Kingston-Conley has set up 15" and 20" Drill Heads

with similar ingenuity in other departments of the plant. Increases in production and job efficiency have been equally outstanding.

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Practical Pointers on Steel Treating Part II

In This Article the Author Discusses the Design of Tools and Dies, Hard Spots in Annealed Bars, Furnaces and Their Applications, and a Radically New Method of Heating Steel.

By W. R. BENNETT

THE steel treater is often presented with a tool or die to harden that appears to be of poor design and from first glance it would seem that the designer did not heed or take any consideration bearing on the success or failure in hardening. Considerable benefit would result if both the steel treater and designer would condescend to work in conjunction with each other, go over the possible faults of design and make the effort to correct them. It is to be feared there are but few instances when this can be brought about. The steel treater need not necessarily be a designer. He can usually discover the weak points at a glance. The designer, however, should fortify himself with some knowledge of steel treating in order that he may be enabled to detect these errors and make his correction before it is too late. A first class steel treater will take things in his stride. He does not complain about design. He proceeds to use his ingenuity by devising ways and means to overcome the difficulties and. as a consequence, experiences very few losses resulting from faulty design. The "fly in the ointment" is only evidenced when a mediocre hardener, usually an active member of the "Heatum, Quenchum and Bustum Society," does, without preliminary inspection, throw a tool into a fire and proceed to heat it, quench it and "bust" it. One would anticipate that that kind of chap could not give a lucid reason for failure and could be expected to repeat. It is quite possible he might awaken to the evidence of faulty design and then place the blame on the other fellow, the designer.

Hard Spots in Annealed Bars

While annealing is associated with and constitutes a phase of steel treating, the usual procedure has not been materially changed. Practically all bar stock is received "Mill Annealed." The manufacturers have gone to no little expense in instituting equipment for the accomplishment of this object and they are today, delivering steel complying with their customer's specifications relative to hardness and

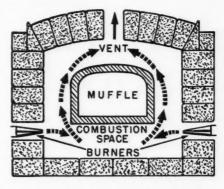
tensile strength. In the light of the foregoing, we as steel treaters are little concerned or interested in the annealing of bar stock. We are, however, confronted from time to time, with a condition that develops trouble. While it is the exception rather than the rule, we have in our experience found pieces of bar stock, supposedly annealed, which were so exceedingly hard in spots, no tool was able to machine them. These hard spots revealed a much brighter surface after attempted machining than did the softer portions and as a consequence, the tools broke down incredibly fast.

We therefore believe ourselves justified in the opinion the steel had not been uniformly annealed. There is a possibility our assumption is in error inasmuch as the softer areas in close proximity to the hard spots appear to be sufficiently annealed and it is reasonable to assume the entire bar, exclusive of the hard spots had been adequately annealed. This condition evidently does not develop in the annealing process but must occur in the melting phase, wherein all of the ingredients were not thoroughly melted. It is hardly reasonable to assume this condition can be corrected by the universally employed process of annealing, consisting of heating the piece and permitting it to cool slowly in lime or ashes.

I have found if one removes the scale or oxide from the piece containing hard and soft spots, then proceeds to heat it to the recognized hardening temperature and quenches it in water, it will be uniformly hard. Inasmuch as we have then a piece of uniform hardness throughout, it is only necessary to reheat to a lower temperature than that used for the quench. Allow to cool in air. One will possess a uniformly soft piece, the hard spots will have vanished and the piece may be easily machined. In the first instance, we had an ununiformly hard and soft piece.

Secondly, we had a uniformly hard piece and finally, a soft condition of the piece throughout.

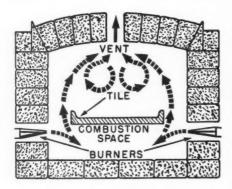
During the first world war, a gentleman representing an arms manufacturing firm, delivered to me several rifle barrels, with the comment, "We are having a lot of trouble trying to drill these barrels. We may be able to drill partly through and then the drill starts to squeak and grind. We



Drawing showing the general construction features of the muffle type furnace.

not only spoil the drills but the barrels are ruined as well. We have experimented with several types of drills, all to no avail. Can you help us?" He was handed a newspaper, invited to take a chair and was informed it would require a couple of hours and if he desired to wait, he could return with them. He replied "Great Heavens, man, we have had them in the anneal for twenty-four hours and gotten nowhere. Now, you tell me I may have them in two hours, it does not seem possible. I'll wait." They were put through, heated, quenched and reheated as described. It resulted in my receiving quantities of these barrels for similar treatment.

Under this caption, it may be well to state, it is entirely unnecessary or advisable to heat a previously hardened piece of tool steel, for annealing to a point within one hundred and fifty degrees F. of that required for hardening. Large tools, previously hardened, made from any steel, should never be abruptly placed in a hot fire for annealing, nor should a hardened tool be placed in a hot drawing bath to reduce the hardness. It is always advisable to pre-heat slowly, in order to lessen the possibility of sudden ex-



Drawing showing the general construction features of the semi-muffle type furnace.

pansion and subsequent bursting. It is also good practice to materially reduce the temperature of the drawing or tempering medium, prior to decreasing the hardness of tools of this particular nature.

As a young man, the writer worked in the small tool hardening department of the Pratt and Whitney Co., Hartford, Connecticut. One day, I placed a previously hardened three inch pipe tap in an oil tempering bath. The temperature of the bath was four hundred degrees F. A few moments later, I heard a recognizable "Ping." The excessive heat of the oil had expanded that tap quickly and sufficiently to split it. A mistake I never repeated. We do, however, learn by making them.

, Furnaces and Their Applications

Every steel treater must use the furnace at his disposal and must therefore put forth the effort to get the best results with the equipment at hand. Practically all steel treating furnaces have their good points and are well designed to heat many different kinds of jobs satisfactorily. Let us proceed to point out a few of the good and bad features of the almost universally employed heating appliances.

Pot Furnaces. Lead is heated in a pot-type furnace into which a pressed steel or a cast alloy pot may be inserted. The lead used must be pure but need not be super refined. Commercial pig will satisfactorily meet the requirements. If any lead pipe, tin or tin foil is dropped into molten lead, the remaining content is immediately spoiled for hardening purposes. Lead oxidizes as quickly as it is melted and due to the influence of the surrounding atmosphere, this condition will continue during its full heating range, unless preventative measures are employed. It is good practice to allow the lead to heat to 1200 degrees F. and then skim its surface free of oxide and dross. Protective measures to prevent surface oxidation are accomplished by breaking charcoal to about the size of a chestnut and placing a handful on the surface. The heat from the lead will ignite the charcoal, forming a gas which consumes the surrounding oxygen. Immediately the charcoal discontinues burning and gradually becomes an ash. Skim off the ash and then renew with more charcoal, enough to cover the surface only.

For taps, reamers, counterbores and in fact all straight carbon steel tools that must be hardened on one end, the shanks remaining soft, the lead bath is an excellent heating medium. The lead bath is the fastest heating unit; it reaches final uniform temperature in a minimum amount of time; it does



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not oxidize the tools and will not heat steel above bath temperature.

One might be inclined to call adhering lead, leaking pots and narrow heating range, "Objectionable features." The answer is "Pure lead will not adhere to steel unless the lead is too hot." There are few instances if any where the base of a lead pot gives way suddenly. Small pinhole leaks usually occur first. At the moment the pot begins to leak, small drops of lead will fall to the base of the combustion chamber, where the heat is most intense, and are immediately converted into a gas which rises and passes out through the vent opening at the top of the furnace. This gas reveals a light grav color and can be noted at once. It is then a simple matter to ladle the lead into a new pot, place the new pot into the furnace after having removed the old pot and proceed as before. When lead is heated to about 620 degrees F. it melts. When it is heated

to 1600 degrees F., it commences to volatilize. This is easily noted by observing the volume of light gray smoke arising from its surface. As the temperature is increased, the volatilization increases and tool steel heated to the increased temperatures in lead will develop surface pitting.

The final objection: A wet or rusty piece of steel, submerged in a hot lead bath will cause an explosion. The preventative measure, "Don't do it."

The Semi-Muffle Furnace. This is a universally employed furnace capable of successfully heating many jobs in a hardening shop. Its internal construction is so well known that it appears unnecessary to discuss it here. If we lay a blanking die, 12 inches long, 6 inches wide and one inch thick on the perfectly level floor or hearth of a semi-muffle furnace and do not take the necessary precaution, we will not be rewarded with a satisfactory job. Suppose we lay the flat side of the

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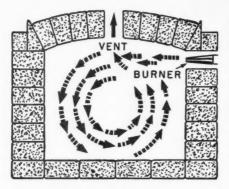
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Drawing showing the general construction features of the open hearth oven furnace.

die on the hearth and allow it to proceed to heat. In a short time, the die will show color over the entire exposed face. We naturally assume, inasmuch as it is but one inch thick, that it must be heated through and has reached the same temperature on the reverse side. This is not true. If we move the die

from its original position to a different locality on the hearth, we will note that the floor space originally covered by the die is several degrees colder than the surface of the die. Here we have two different heating conditions. Five exposed surfaces of the die were being heated by radiation, the remaining side, resting on the floor, by conductivity. If we allowed the die to remain in its primary position until it was quenched, the die would be out of alignment.

The usual reaction of the hardener might be "Gone out in the quench." This also is not true. The die has gone out in the heating and was distorted before it entered the quench, thus bearing out the statement "If we quench a piece crooked, it can't come out straight." The face of the die attained the heat faster than the base and consequently expanded more and, as a matter of fact, the base never did catch up. Of course, the blame for this

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27411/2 South Troy St., Chicago 23, Illinois

condition cannot be attributed to the semi-muffle furnace. Any other furnace wherein one is forced to heat a long, flat piece on the hearth, will produce the same results.

Can we rectify this condition and continue the use of the semi-muffle furnace? Let us visualize the die in its original heating position, partly heated on the upper surface and considerably colder on the bottom. Let us also assume that owing to this unequal heat, the die has expanded to a greater extent on the hotter surface and consequently is out of alignment. At this point, suppose we move it to another position on the hearth and at the same time, turn the die over, thus reversing the heating condition. We are mindful that at this period, the die is only partially heated. Turning the die over will provide for equal expansion and by the time the die has reached the critical. there will be no evidence of distortion caused by heating.

The Electric Furnace. With the exception of circular pot heating furnaces, manufacturers have, to a great extent, adhered to the almost universally used rectangular types. The electric furnace builders, however, have departed from this procedure to an appreciable extent and are making cylindrical perpendicular heating furnaces. That their present developments are correct, no one can question.

To the hardener it makes little difference what the nature of the heating element may be but it is important to him whether a long piece is heated on the floor of a furnace or suspended perpendicularly in an oven. Any cylindrical, perpendicular furnace in which a piece may be suspended, and which will heat to a uniform degree, maintain that degree and operate with temperature and atmospheric control is superior to the hearth type for heating long pieces. The cylindrical, perpendicular furnace will assure greater uniformity in final heating results.



features unique dial-feed tooling . . . handles small high-speed production runs in rapid sequence

A new high in small-parts production efficiency! The dial-feed table of this MULTIPRESS is fitted with 12 tool-holding "nests," which fit 10 different sets of interchangeable dies. Down time is cut to near-zero; tool changes require little more than lifting one set of dies from the nests, and setting new ones in place. Guide pins automatically locate the table dial. Through this quick change-over, one MULTIPRESS handles work that ties up two or three ordinary presses.

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The Muffle Furnace. This furnace is the stepbrother to the semi-muffle. It is made in comparatively small units and is intended to be used for heating small parts. It comprises a retort or box made from a heat resisting refractory and is inserted on the floor of a semi-muffle oven or an oven of similar construction. This box is closed on all sides but that side which is in close proximity to the furnace door opening and its interior is supposed to be entirely out of connection with the heated products of combustion of the furnace proper, an advantageous feature in itself.

These internal muffles, however, are located in a horizontal position on the hearth of the furnace and their only opening is at or near the furnace door opening. It makes little difference whether the oven is fired by gas, oil or electricity, this so-called muffle is not a muffle and will not function as such, unless measures are taken to

prevent any oxidizing atmosphere from entering the oven when the oven is opened.

Making "Moly" Behave

Molybdenum high speed steel is a cantankerous steel insofar as surface condition after hardening is concerned. It is probably more sensitive and susceptible to the attack of oxygen and other heat constituents than many. if not all other steels.

The writer possessed no muffle, semi-muffle or electric furnace in his factory wherein he could successfully heat and harden molybdenum high speed steel without developing soft exteriors. Covering the partially heated piece with powdered borax helped to alleviate this condition but often, the cure was worse than the disease, inasmuch as borax, when it contacts the heated floor of an oven, will remain where it falls and spoil any heating piece that comes in contact with it.



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Write for Catalog A-415 NOW AGET-DETROIT CO.

207 Main at Washington Ann Arbor, Michigan As a result of "Moly's" misbehavior, it was decided to build a furnace that might be operated wherein the furnace gases would be entirely separated from the work.

An oil drum was procured, thirty-six inches in length and twenty-two inches in diameter. Both the top and the bottom were cut out. It was then set on a leveled concrete floor and ground asbestos was tamped inside at the base to a depth of two inches. On the top of this insulation, fire brick were laid flat, leveled and grouted with fire clay. At the center of this base a pedestal, made of fire brick, circular in shape, eight inches in diameter and eight inches high was placed.

On the top of the pedestal, there was laid a circular carborundum disc, eight inches in diameter and two inches thick. The interior circular wall of the furnace was built with circular fire brick, laid from the base upward to within four inches of the top of the shell or drum, permitting a space of two inches between it and the outer shell for insulation. This provided a circular opening eleven inches in diameter from the base to the top of the brick. The space between the outside periphery of the brick and the inside periphery of the shell was tamped to the top with ground asbestos for insulating purposes.

On the top of the circular wall, wedge brick were laid up to and even with the top of the shell. They were, however, allowed to extend toward the center to form a reduced circle, leaving the top opening eight inches in diameter. Through this top opening there was inserted a carborundum tube, twelve inches high, seven inches outside diameter and six inches inside diameter. The tube rested vertically on the carborundum disc at the bottom and formed a seal against the entrance of furnace gases. The upper end of the tube reached to about four inches below the bottom point of the offset

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590 SOUTH MILL STREET . NEW CASTLE, PA.

brick. For the top cover, a flat one quarter inch thick boiler plate disc was cut to a twenty-two inch diameter circle, an eight inch diameter hole was cut in the center and then the disc was cut in halves.

The furnace was equipped with two burners and could be fired with either gas or oil. The two pipe system was used, manually operated. The lower burner opening, one and one quarter inch round was located on a line slightly under the carborundum disc. The burner hole was cut through the shell at a tangent and positioned so that the flame would encircle the furnace wall. The second burner was positioned on the opposite side of the furnace located eight inches higher and the flame traveled in the same direction as that of the lower burner. The burner points were positioned one half inch away from each opening.

On the top of the furnace were placed two fire bricks approximately two inches thick and large enough to cover the top opening when they were drawn together. They were never entirely closed except when operations were discontinued. When the furnace was started, the top bricks were opened about four inches until the furnace and tube had reached the desired temperature. We then partially reduced the size of the opening, allowing the heated products of combustion to pass upward, over the top of the tube, out of the opening at the top and ignite with the surrounding air.

Our next step was to "Purge" the tube by dropping in a piece of hard wood charcoal, about the size of a hen's egg. Immediately as the charcoal reached the bottom, it commenced to burn, showing a noticeable flame. It remained burning until the flame had consumed all the oxygen in the tube and then became heated through as would a piece of steel.

It will be noted that furnace gases



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GREASE & OIL RESISTANTShipped in Complete Unit!

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(2) M.F.P. is far more grease resistant than other patching materials. It requires only ½ inch "chip out" around edges.

only 1s inch "chip out" around edges.

(3) In addition to its shatter-proof properties, M.F.P. has a surface hardness and smoothness reducing load-drag to the minimum.

(4) M.F.P. can be applied over concrete or wood, and is of the same color as concrete.

(5) It is shipped as a complete unit—there is no sand, stone, cement nor any other material to buy.

(6) M.F.P. is extremely easy to apply and a good job can be done by anyone who will follow the simple directions.

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M.F.P.

(MACHINE SHOP FLOOR PATCH)



were entirely out of contact with the interior of the tube. They were on their way out through the upper opening and in passing, they consumed any influence from the atmosphere intent on entering. This furnace, operated as described, constitutes a C O generator and the interior of the tube will remain neutral indefinitely until the source of fuel is discontinued. The operation of "Purging" must be performed each time the furnace is re-heated.

Each piece was attached to a wire and suspended in the tube. The opposite end of the wire was fastened to a rod positioned across the top of the

furnace over the opening.

This specially designed furnace brought "Moly" to her knees. No longer did she "act up." While our primary object was to make "Moly" behave, we also found to our great satisfaction, that the "Purged" tube brought straight carbon steel, manganese oil hardening, tungsten high speed and high carbon-high chrome steel into line and we were enabled to heat any and all of them without the development of scale, soft exteriors, carburization or decarburization.

"They Cover the Field," an eight-page two-color catalog issued by The DoAll Co., Des Plaines, Ill., is designed to facilitate the selection of the proper band sawing machines for the high speed contour cutting of a wide variety of materials. The catalog presents illustrations, descriptions, and specifications of a complete series of high speed DoAll Zephyr Band Sawing Machines ranging from a "utility" model weighing 425 lb. with a 16-inch throat to a powerful precision model weighing 5,640 lb. with a 60inch throat. Standard, as well as special, equipment is illustrated and described. Listed are 62 representative materials that may be contour cut with the machines. Illustrations provided show some of these materials being cut. Copy of catalog free upon request.

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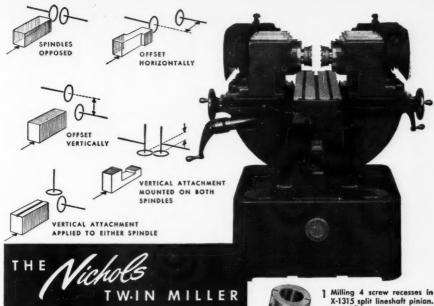
(B) The head of the ubiquitous "Unbrako" Socket Head Cap Screw is KNURLED to speed assembly. The KNURLS "gear" right to the fingers, no matter how oily, and a positive slip-proof grip is the result—no waste motion. Of course, the Internal Wrenching feature provides cost savings in material, weight and space.

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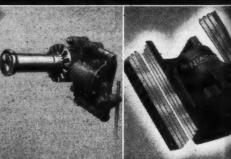
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Brake automatically compensates for wear as well as expansion due to heat of operation. Drum and band marked to indicate correct adjustment.

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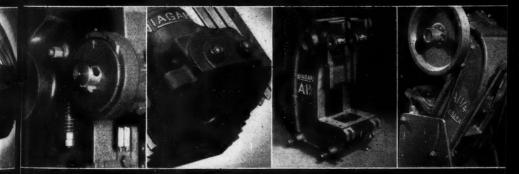
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A Philosophy of Human Relations Part II

Dillard E. Bird

Interviewing the Job Applicant — Indoctrinating the New Worker — Training the New Worker For His Job.

By DILLARD E. BIRD

THERE are no short cuts to sound human relations. There is no way that any management personnel at any level can delegate the job and then forget all about it. Neither can the whole job of building human relations be handled by any one or any selected few individuals whether they be line supervisors or staff specialists. Human relations is the job of every management member-every supervisor from top management down to and including the lowest level of face to face supervision. Top management must, of course, first of all establish the example which each subordinate level may follow in making human relations policies effective. While each member of management-each supervisor-must play his part in the building of human relations with the personnel for whose direction he is responsible, the major task must be assumed by those first line supervisors who have the direction and therefore the closest relationship with the workers of the organization. It is at this level that human relationships are made.

"Where do we begin?" Often when we ask this question before tackling

any major problem, we are told that "there is no place to start like the beginning." The beginning in this case is at the point of initial contact with the worker. This is the point at which the worker begins to form his impressions of the company and the people who make it up. The basic principle underlying the development and maintenance of sound human relationships is that people want to cooperate. We also have said that it is the job of supervision to make it easy for people to cooperate. We must not forget that human relations has its basis in the relationships between the individuals in the organization and that human relations are only group relations in the sense that they are collective and cumulative. If the individual supervisor is going to create and maintain good human relations within his group. it means that he must have the right kind of relations with each individual in the group and if he is going to accomplish this, he must make sure that he makes it possible for each individual to cooperate with him from the very beginning. Every effort should be made to have the first impressions good, since all subsequent reactions

may be influenced by these very first impressions.

What can the company and the individual supervisor do to make it easy for people to cooperate right from the beginning? How can the company get off on the right foot with the new worker? The effort to make it easy for workers to cooperate must begin at the point of the worker's initial contact with the company and that means when the worker visits the premises to apply for a job, while he is still an applicant and before he becomes an employee. What then does the applicant have a right to expect?

The applicant has a right to expect and really wants, first of all, a prompt and courteous reception. He does not like to be confronted with the gum chewing, flippant, or otherwise careless type of receptionist who considers that she is doing him a favor to ask what he wants. Nor does he like the officious type whose questions and answers are cold and generally unsatis-

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The applicant wants the privilege of filing an application. He may not always exercise this privilege, but he likes to know that he may if he cares to. I think many times we err grievously by not permitting an applicant who so desires to file an application whether or not we have a job opening. Of course, the applicant should be told that there is no job opening if such is the case, but then if the applicant wishes to file an application, he should be permitted to do so. The cost of the printed application form is nothing compared to the ill feeling which could and does result at times from the refusal of this privilege. If there is a job opening or a reasonable possibility of one, the applicant wants an intelligent interview. This implies that the person or persons conducting the interviews know the facts about the company and the job for which they are interviewing; that they know and



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understand the techniques of interviewing; and that they are capable of conducting an objective interview. Not many weeks ago, I heard the superintendent of a company say, "I can tell all about a person after I talk with him for two minutes and whether he will work out in this company—and I am always right-I never change my mind." Such prejudice in an interview precludes the employment of many capable workers and forecasts the selection of many workers who may not be qualified for the work for which they are employed. This attitude is as unfair to the company as it is to the individual worker.

The worker wants an honest statement of his employment possibilities with the company. Nothing is gained by falsely encouraging the worker to think that his chances of securing a job with the company are good when the chances are remote. Yet, this is

a practice sometimes indulged in by those performing the employment function who think that it is wise to have a file of applicants for every type of job for which they employ "just in case." The truth of the matter is that the value of applications of the type workers desired lies in the currency of the applications. The worker whom all employers want is the one who failing to secure employment at the point of initial application will continue his active search until he is successful is securing the employment he most desires.

In the event that the applicant is offered employment with the company, he is entitled to a clear statement of the duties and responsibilities which the job offers, the wages, hours, and working conditions which the job carries with it, and any other pertinent facts. If the applicant is not given this information, he is taking a "shot





Above: Hand-powered Type A-30...up to 180° bends...all sizes from ½" to 2". Only 7 parts. World's fastest, simplest machine. Note assortment of bending dies...this process makes shorter tangents than any other. Occupies only 18" x 18" floor spacel

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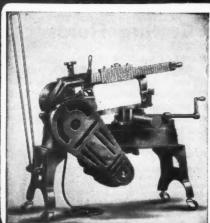
in the dark" and there are very few shots in the dark which hit the target. Such practice in hiring is costly to the company and worker alike.

Now, if the worker is offered and accepts employment with the company, he should be given; a review of the job duties, responsibilities and requirements: a statement of the starting wages and hours and a full explanation of the wage plan under which he will be employed; a description of company products and services and the part of the new worker in their production; an explanation of company policies, regulations, and services as they affect the new worker: as well as a full statement of health and safety policies, practices, and regulations.

All of the foregoing may be covered by the supervisor directly with the worker or they may be covered by a representative of the personnel department (by whatever name it is known in the individual company). In those cases where the personnel department assumes a portion of the responsibility for the induction and indoctrination of the new employee, it is only acting for the supervisor to relieve him of some of the detail work involved in getting the new employee on the payroll. Such services provided by the personnel department permit the supervisor to devote more time to more personal aspects of the induction and indoctrination procedure and to other highly essential phases of his particular job.

Regardless of the degree of assistance which the personnel department offers or is prepared to offer, the individual supervisor always carries the responsibility for the satisfactory adjustment of each new employee to his entire work situation, the job, the other workers, and the supervisor. This is a responsibility which cannot be passed to anyone. The company

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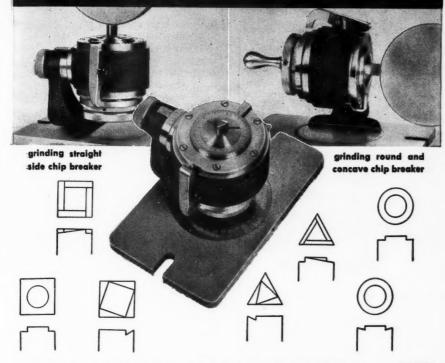
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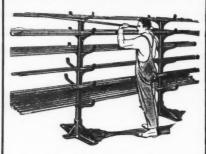
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may have an elaborate overall induction or indoctrination procedure or it may have none. No matter how extensive the formal induction procedure which is prepared and administered by the company, unless the individual supervisor is successful in developing a proper series of relationships with the new worker, the overall company procedure will probably have been a waste of time, at least insofar as that particular worker is concerned. Contrariwise, the fact that a company has no organized formal induction procedure does not prevent the proper orientation of the new worker if the individual supervisor performs his job of indoctrination properly.

The induction and indoctrination procedure must vary according to the needs of the individual situation. The goal of the induction procedure should be that the worker will feel that he is happy that he applied at the company for employment, that he likes everyone he met, and that he is going to be proud of his association with the company and consequently is anxious to begin his employment with the company. The creation of this kind of frame of mind will do much to propperly condition the worker's thinking and make him receptive to the instructions and supervision he will receive during the course of his employment with the company. This is the way we make it easy for him to cooperatefrom the very beginning.

One way to make it easy for people to cooperate is to let them know the job they are to do, and how, when, where, and why it is to be done. Long ago a wise man said, "Knowledge is power." The only way to let people know the what, how, when, where, and why of a job is through training, and if training is worth doing at all, it is worth doing well.

The training of the individual worker then, is the next step to which the supervisor must give his careful at-

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tention if he is to make it easy for the worker to cooperate. It is necessary to find ways and means by which we can communicate ideas so that they will be understood and retained. This means that the supervisor must follow all the precepts of teaching and learning. While it is true that all workers are not the same and the exact same pattern cannot be followed in the training of each, there are certain basic principles which apply to all.

The learner must understand the purpose of the activity which he is being taught if the teaching is to attain maximum effectiveness. He must be made to feel that success in learning will mean something personally valuable to the learner. At the very outset, the learner must be made to feel that his instructor has a personal interest in him, that he has a good instructor and that if he applies his best effort, there is no reason why he cannot become proficient within a reasonable period of time. The security and confidence which results speeds the learning process.

The only way by which we can learn is through the senses. Every action we take, every thought we have, originates through the stimulation of one of our senses: sight, hearing, smell. taste, touch, or muscular. The more senses stimulated in the teaching process, the more likely the learner is to retain the idea and make what he has learned a part of him. The new or inexperienced instructor is very likely to make the common error of trying to instruct only by telling the worker, appealing only to his sense of hearing. A good instructor will not only tell the trainee, but will show him and let him do it, appealing to as many of his senses as possible.

Another common error of the inexperienced job instructor is to present too many ideas at the same time. The old saying about having a one track



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mind has a very sound psychological basis. We can give our undivided attention to only one idea at a time. Good instruction requires that only one idea be presented to the learner at a time. The learning should begin with something simple and familiar and proceed step by step into the complex and unfamiliar. This permits the learner to increase his knowledge of the job and related information by easy stages and to feel a sense of accomplishment at each stage, rather than the discouragement that would come to many of finding it difficult to absorb too much or too complicated a process at one time.

The learner, of course, must be asked to give his undivided attention to the learning process. Here the instructor plays a major role because he must find ways and means of interesting the learner in learning if he is to get and hold his attention. Again, he must show the worker the advantage

to him of learning the process as taught and he must find ways and means of making it easy for the worker to start. This can often be done through the use of recognition and praise for a job well done, giving a sense of accomplishment as the training progresses and he should not be afraid to use mild disapproval when it is warranted.

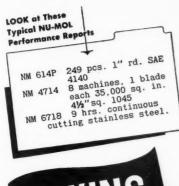
When the activity has been learned, it is necessary to repeat the process until the learner's new knowledge and ability has become a habit and that which he has learned has become a part of him. The learner should, whenever possible, be given the freedom to develop his own variations and use his own abilities to the fullest advantage. At all times, his progress should be noticed and rewarded; and he should be praised for what he does right more often than criticized for what he does wrong.

Up to this time we have been talk-



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ing about the general methods to be applied and it may seem that we have not given full enough consideration to the fact stated earlier that we are all individuals and as individuals we are different. Individual differences apply to learnability as well as to other phases of human relations. The good instructor will consider the capacity of the individual to learn, the speed with which he can learn, and his ability to retain and apply what he has learned. The broad training pattern must be varied with the individual being taught.

Individual instruction is costly and yet group instruction cannot be relied on to do the job alone for it fails to recognize individual differences. Group instruction, where it is used, has to be presented in a manner which will permit the slowest learners in the group to follow. In the meantime, the more rapid learners in the group may and probably will become disinterested. In the training process, we must not only give attention to the slow learner who requires the additional help and instruction, but to the rapid learners as well.

Many times because we have no problem in the instruction of certain workers, we are prone to overlook their capacities and abilities. It is the responsibility of the supervisor to find jobs for these superior employees with duties and responsibilities which will challenge them to even greater achievement.

Few, if any, of us have much more ability than our fellows when we are born. We do have some latent abilities and capacities which come to us as a part of our heritage. Those of us who are successful in developing some of our abilities to the fullest are indebted to someone for this development—our parents, our teachers (school), our friends, and our supervisors, in our work-a-day world. It is one of a supervisor's greatest obligations to so train

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that he can develop the latent abilities in those persons charged to his supervision, and I am sure that there can be no greater pleasure for a supervisor than to feel that he has contributed to the development of some individuals who have responded to his efforts and whose achievements under his direction have been outstanding.

The tenets of teaching and learning which we have just covered are prerequisite to a successful training program. There are also certain fundamental principles which apply throughout the training process.

Training Principles

Preparation

The first job that the trainer has to do is to prepare himself before he can think of instructing others. This means that he must know the job thoroughly and must have worked out in advance his method of instructing others in the performance of the job, keeping in mind all of the principles of teaching and learning. He must decide what the learner must be taught, keeping in mind efficiency, cost, and safety. He must have the right tools, equipment, supplies and materials ready. The work place should be properly arranged just as the worker will be expected to keep it.

The first step in the actual instruction process must, in all cases, be to put the learner "at ease." Ways must be found to offset the natural tenseness which a worker is likely to feel when learning a new assignment. He must find out what the worker already knows about the job. It is not only a waste of the trainer's time and the learner's time to repeat those things with which the learner is already thoroughly familiar, but such repetition is likely to cause loss of interest on the part of the learner and consequent lack of full attention to



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that which is being taught. This is something that should be avoided in all cases because the learner must be interested in the learning process and he must be made to want to thoroughly learn the job.

Basic Instruction

When adequate preparation has been made, the supervisor is ready to begin his actual instruction. Following the principles of teaching and learning, he must tell, show, and question the learner on each of the ideas presented, thereby appealing to as many of the senses as possible. He must instruct slowly, clearly, completely, and patiently, one point at a time. As each point is presented, the trainer must check his instructions. question the learner, and repeat his instructions until he is sure that the learner has really learned. Application

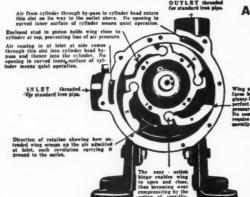
The trainer must then have the learner perform the job. Sometimes it

is necessary to have him perform each step of the job as it is taught and in other cases, the complete cycle of a job must be taught before the learner is ready to perform the job. The learner must know why he performs each of the steps of the job in the manner in which he has been instructed. This means that the trainer must have the learner tell him how he is doing the job and why he is doing the job in that particular way. The learner must be observed as he performs the job. Any errors which are made should be corrected immediately and wherever necessary, in order to make the instructional situation clear, instructions should be repeated. This process must be continued until the trainer knows that the learner knows.

Follow-Up

This step is nothing more than continued supervision. When the trainer is satisfied that the learner has learned, that he knows how to per-

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form the job and why he is performing it, and that he is "ready," he should put the learner "on his own." Supervision should be close enough to ensure that the learner is following the instructions which he has been given and that he is able to work alone. As the learner shows that he is capable of working with less supervision, the extra supervision may be tapered off until the trainer is satisfied that he is qualified to work with a normal amount of supervision.

Most of our discussion on training as a way of making it easy for people to cooperate has been concerned up to this point with the direct job instruction given the learner by the trainer. We have said that a trainer must make adequate preparation before he begins the training process; that he must then offer the basic instruction necessary to train the learner in the performance of the operation; that he leads the learner in applying what he has been taught, and that he continues to give such supervision as may be required to ensure adequate and effective performance on the job. There are a number of training devices which people active in the training field frequently use. The supervisor who is to be a good trainer should also be familiar with these training tools.

One such device is testing. It is important that the workers assigned to the supervisor be capable of absorbing the training which is to be offered. Psychological tests can help select individuals who will respond readily to further training, and after the training has begun, tests can often be used to bring to light the shortcomings and deficiencies of an individual which can be corrected through training. Tests can be used to advantage to show the weak spots in the training program which can be corrected and tests can also be used in certain occupations to present information to trainees. Test items which the trainee must think



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through or solve for himself are not readily forgotten. If a trainee makes an error on a test, he is usually anxious to find the correct answer. Consequently, he is not likely to make the same error twice. He will remember the correct answer.

Another training device which is used is that of individual counselling. The supervisor, in talking things over with the employee, often has an opportunity to instruct. In the counselling situation, the employee may mention or give evidence of problems, misconceptions, or lack of understanding. The supervisor can make effective use of individualized training in eliminating these interferences and, thereby making it easy for the employee to cooperate.

Summary

There are no short cuts to human relations. The building of sound human relations is an essential part of the job of each management representative. Emphasis must be given to the fact that effective human relations is the day-to-day job of the first line supervisor who has the responsibility for the direction of the productive workers of the organization. If the supervisor is to make it easy for people to cooperate, these efforts must begin at the point of initial contact with the worker, following through the induction and indoctrination process.

The successful completion of the induction and indoctrination of the worker must be followed by a thorough training program based on all of the principles of teaching and learning, with the individual supervisor making sure that he is adequately prepared for the instruction situation, that the instruction he offers and the basic elements of the job follow the best of the accepted principles of training, that he permits the trainee



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to perform the job under close and continued supervision, questioning and correcting wherever necessary to make sure that the learner has learned, and then following up the trainee with continued supervision, checking to make sure that he follows instructions and tapering off the extra supervision until the worker is qualified to work with normal supervision.

The careful development of the worker through these early phases of his employment with the company are prerequisite to making it easy for him

to cooperate and essential in the building of sound human relations.

If you would like to Test Your Training I.Q. a copy of the author's self-appraisal questionnaire will be sent you for completion and return to us. The questionnaire will be scored and returned to you. Address your request to:

Human Relations Editor Modern Machine Shop 431 Main Street Cincinnati 2, Ohio

Human Relations Forum

1. Q. What do you think of the effectiveness of the conference method of training?

A. I think the conference method of training for supervisors can be used with a great deal of effectiveness in developing a unanimity of thinking on a subject where the thinking has not vet been fully crystallized. However, the conference method has been greatly overworked and many advantages claimed for this method can be secured in equal or greater degrees from other methods. We should remember that the conference method is just one method of training. It appeals only to the sense of hearing and those people who are auditory-minded gain most from this method. In my opinion, that training is best which stimulates the most sensory organs because the chance of retention of ideas is made greater when an appeal is made to additional senses. There is one additional fault which I find in the way that most conferences have been conducted in the past. They have tended at times to insult the intelligence of the members comprising the group, in that the leader has started with his thesis in mind and by drawing contributions from the several conferees eventually the thesis has been established toward the end of the session. If the conference is to be used, my own preference in conducting a conference is to state the thesis first so that the group knows from the beginning what the leader



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vs er has in mind and then it is possible to work back from that point and establish the justification for the conclusions stated at the beginning.

2. Q. What is the first step in the development of a good Human Relations Program?

A. The first step, in my opinion, is to make sure that company policies. objectives, and ideals are compatible with the Human Relations program which we wish the supervisors in the organization to make effective. The second point on which management should satisfy itself is that the organization structure is sound, that lines of responsibility and authority are clearcut, and that each person in the organization knows his own functions and how they relate to those of his associates. These two sets of factors are fundamental and basic if a sound and effective Human Relations program is to be developed.

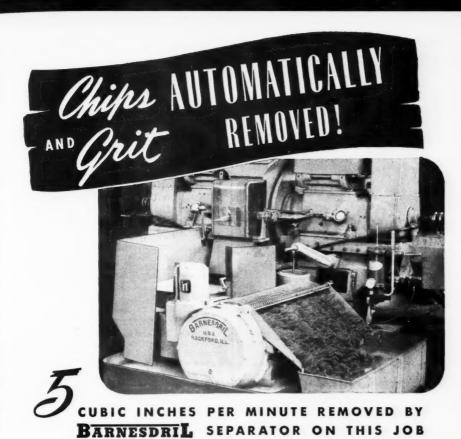
3. Q. How important is the psychological testing method in the selection of employees?

A. The importance of psychological testing varies from company to company and with the type of job for which employees are being selected. Psychological tests can be very important if properly used; however, testing is only one of the selection aids which can be used with effectiveness. It cannot do the whole job alone. It must be considered and used as one selection device and the weight which is placed on this device will vary from one situation to another.

4. Q. What do you think the minimum educational requirement should be for factory unskilled labor?

A. I think the minimum requirement, wherever possible, should be the ability to read and write. If the individual worker in industry is unable to read and write, he will not be able to





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understand the safety and health signs which are posted, and he may become a safety or health hazard. The problem of supervision is made more difficult and in many cases the individual would be unable to compute his own earnings which is not a good situation. He will not be able to read any communications which management might direct to him and management will thus be seriously handicapped in their efforts to develop a feeling of mutual confidence and understanding between themselves and the workers which comprise the organization.

This column will answer questions on Human Relations and associated problems. Direct your questions to the Human Relations Editor, Modern Machine Shop, 431, Main Street, Cincinnati 2, Ohio.

Waldes Truarc Retaining Rings. An engineering specifications and data catalog with 28 pages of charts for all standard types of Truarc Retaining Rings is now available from the Truarc Division, Waldes Kohinoor, Inc., 47-10 Austel Pl., Long Island City 1, N. Y. Data include ring dimensions, housing and shaft dimensions, groove dimensions, thrust load capacities, materials, tensile strengths, and types of finishes. Also provided are charts listing engineering recommendations and Truarc ring specifications for standard ball bearing assemblies. Copy of Catalog No. 4K-6 is offered free to all individuals addressing requests on their company letterheads.

Warner & Swasey No. 11 Tapping Machine is the subject of a bulletin published by The Warner & Swasey Co., 5701 Carnegie Ave., Cleveland 3, Ohio. The bulletin covers the design features of the machine for sensitive high accuracy operation and lists complete specifications for the unit, which has a capacity range of from 1/8-inch pipe thread to 5/8-inch N.C. or N.F. Electrical controls, speed changing, and the cutting of left-hand and external threads are illustrated and described. Also shown are accessory precision collet tap chucks, slip-on oversize work tables, vises and special fixtures. Copy free upon request.

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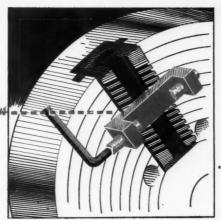
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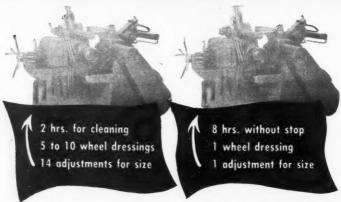
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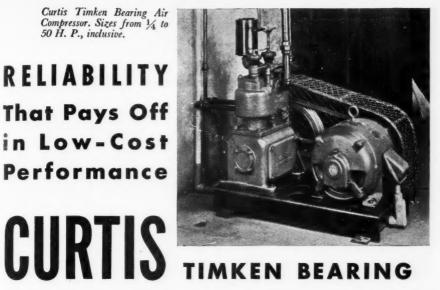
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Progressive Die Design, Part XII

The Author Describes Two Types of Transfer Feeds and a Progressive Die Equipped With a Transfer Dial.

By C. W. HINMAN Designing Engineer

TRANSFER feeds for use in conjunction with progressive die operations may be of two general types. In one type, individual workpieces are transferred in straight line production from station to station such as in a multiple-station drawing press used for redrawing small cylindrical shells. In the other type, the workpieces after being severed from the strip are transferred either to the right or left of the production line for adding one or more operations that would be impossible to perform while the work and strip were united.

As an example of the first type of transfer feed, we might consider the succession of operations which are performed on previously blanked and drawn cups. The cups are individually fed onto a friction dial which carries them into either a series of gripping fingers of two parallel horizontal feed bars which, in turn, carries them into consecutive stations for reducing and flanging operations. The multiple-station drawing presses in which these transfer feeds are employed may be either of the vertical or horizontal types. The horizontal multiple-station drawing press is provided with two parallel feed bars running full length

across the faces of the dies. The bars are provided with V-shaped notches on the inner edges, the notches being located opposite each other at each die station. When the ram advances, the bars are separated by the entrance of the punches. As the punches withdraw, the knockouts in the dies force the bottoms of the cups out flush with the face of the dies. The two bars are forced inward by spring action until the shells are located in the V-notches, then move the shells forward one station, release the shells and then return to the original position. This operation is repeated at each press stroke, with one shell feeding in and another leaving the press. The Vnotches, of course, must fit the shell diameter at each station.

As a rule, progressive die operations are considered straight line production operations for the reason that a connecting link of metal remains between the blanks and the workpieces until the very last operation has been performed. An exception to that rule may be found in the progressive die setup which has been designed to form the paper tube base shown in Fig. 31 after the blank has been severed from the strip. The blank could not have

been drawn or flanged if it had remained attached to the strip. Therefore, the instant that the blank is severed from the strip it must be transferred in some way, either to the right or left of the straight line production, in order to receive additional forming.

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It is possible to transfer the severed blank to additional forming dies in either one of two ways; namely, by means of a cross carriage or by means of a transfer dial. In the setup described herewith the progressive die is equipped with a transfer dial which functions as an additional station dial.

Progressive Die With A Transfer Dial

In fabricating the circular bottom for the paper tube shown in Fig. 31, we use a work strip of No. 34 (0.0086 in.) U. S. gauge dead soft steel. The seven station progressive die that produces this piece is shown in Fig. 32.

The first die operation shallow draws the circular bottom up into die D by punch C, at station No. 1, which is a compound die. When the press ram ascends, the drawn work is "stripped" by means of a spring pad ejector, shown in the die, and by the ascent of spring-pad E. The scrap strip and the workpiece are then advanced toward the left. Between stations 2 and 3, two side cutting punches G-G trim the circular blank outlines through die block J. A small neck of metal is left between the blanks for holding them together while passing the strip and blanks to subsequent stations. The work is stripped from punches G-G, by the positive channel stripper-plate K. This is not a difficult operation because the cuts are not confined and flare out near both edges of the strip. Punches G-G are provided with side heels that enter the die ahead of the cut and prevent punch deflection.

Between stations 3 and 4, two bullet nosed pilot punches H-H enter die J and straddle the small neck between the workpieces. This action aligns the

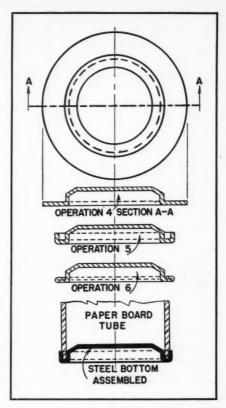


Fig. 31—Drawing showing workpiece which is formed from S.A.E. 1010 No. 34 U.S. gauge steel strip. The workpiece is designed for use as bottom of a paper board tube as shown in the lower view.

strip and work over the dies, and keeps the strip in straight line production. Station 4 is idle in order to gain sufficient space in the die for cutting out the connecting neck with punch blade I between stations 4 and 5.

In the final straight line movement of the strip, the forward blank registers against stop block N which is attached to plate L. A cavity, as shown, or a V-stop within block N, aligns the strip and work a second time. After severing the neck, the work appears as shown in operation 4, Fig. 31.

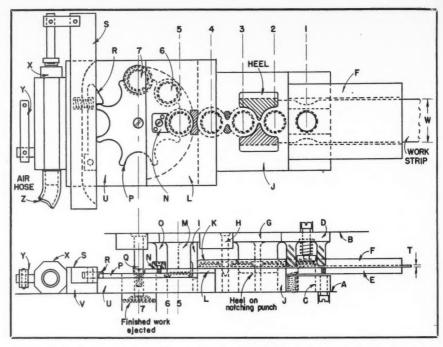


Fig. 32—Illustration of a five station progressive die in which a transfer dial is used to provide two additional work stations.

The work is now separated from the strip and all the remaining operations must be performed by means of the transfer dial P, which in this case is a circular dial that contains eight equally spaced U-shaped openings of a size that will fit around the work pieces. The work is retained within the U-shaped openings by a semicircular wall represented by the dotted arc shown under die plate L. Indexing of the dial is performed by air cylinder X, attached at the left end of the press tool on die shoe A. This air unit is operated by a three-way valve attached to lever-arm Y.

Operation of the Transfer Dial

Valve-arm Y is operated by an attached rod, not shown, but the upper end of which is linked to punch holder

B. When the punch holder starts to descend, dial P and work are in the positions shown in Fig. 32.

During the first 90 deg. descent of the press-crank and punch holder, latch-hook **R** is activated by the air cylinder which moves slide **S** to which it is attached. Dial **P** and the work-pieces are then revolved one station in a counter clockwise direction. The dial is provided with a friction spring to prevent its running ahead. The work in station 5 is carried into station 6, and station 5 is then ready to draw the next blank, which has just been advanced over it.

After indexing occurs, and the punches continue to descend, drawing punch **M** carrying blade **I**, severs the work from the strip, and by further descent, punch **M** draws the severed

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THIS A.S.T.M. viscosity tube, used to test oil, has an opening so accurate to size its final dimension is determined by stopwatch.

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Cost of making this super-precision instrument comes high—a "reject" during the finishing stages means serious loss. Hours of skilled labor might be wasted

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work down through die plate L, the latter being only ¼ in. thick. The shape of the work is now represented by operation 5, Fig. 31.

On the up-stroke of the punches, latch-hook **R** assumes its normal position, as shown in the illustration. In the next descent of punches, the outer rim of the workpiece is curled inward and "spanked" flat by punch **O** in station **6**. This action finishes the work, as shown in operation **6**.

In the next down-stroke, the dial is indexed again, as explained previously, and the finished work passes into station 7. When the punches descend the work is contacted in station 7 by ejector punch **Q** and is pushed down through a clearance hole in die block **U** where it is free to fall through the block, as shown in the front elevation of the die. Finger stops for starting a new strip are not shown in the die drawing, but can be arranged to operate through channel stripper plate **K**, by using finger trip-levers.

This type of transfer dial suggests that other work stations may be added if necessary. Piercing, embossing, forming, stamping patent dates, and ornamental designs, can be performed before ejecting the work. If the work is square or rectangular instead of round, the U-slots in dial P can be made to suit the outlines of the work.

The face of drawing punch O is provided with a circular opening that clears the drawn body on the work, but the opening has an interior angle that "folds in" the rim on the work. The purpose of folding over and flattening the rim is to provide a smooth surface without burrs which avoids cutting the paper board tube shown in the lower assembly view, Fig. 31.

The assembly of the workpiece to the paper tube is performed on a special machine in which an agitated hopper, for the steel bottoms, delivers them under the paper tube ends for assembly.



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New Beryllium Copper Molds

An economical molding process which features the combined use of hobbing, casting, and press forging operations.

By FRANK CHARITY

W ESTERN die casters and molders have recently achieved large reductions in their tooling costs, without parallel reductions in the quality of their molds, through the development and application of a new beryllium copper fabrication technique.

In essence, the process might be termed a combination of three older methods—hobbing*, casting, and press forging—since it involves the use of a steel pattern in order to create the molds from beryllium copper in alternately molten and semi-fluid conditions. The advantages of the new process can be briefly summarized as follows:

(1) It does not require long hours

of painstaking work necessary to produce cavities as is the case with molds made of tool steel.

(2) It permits the use of patterns, or hobs, with thin sections which usually would be damaged if used to hob cavities in a conventional manner—i. e., by forcing the hobs into the surfaces of annealed steel blanks at room temperature.

(3) It yields molds which have better physical properties than the molds made by sand or investment casting methods. In fact, beryllium copper molds are generally equivalent to good steel molds at operational temperatures of less than 1000 deg. Fahrenheit.

According to officials of W. S. Harmon Company at Los Angeles, the economic advantages of the process are particularly great when two or more

mold cavities are required—either for multi-cavity molds or for duplicate molds. As many as 50 identical cavities have been

*This method is designated as hobbing or hubbing, because a "hob" or "hub" is used, which has a shape corresponding to the impression required in the die.

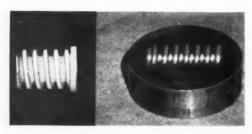


Illustration showing a small, intricate hob at the left and a beryllium copper mold at the right.

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200 Varick Street New York 14, N. Y. made with a single hob having surface dimensions of as much as 144 square inches and irregular parting lines without a loss of clarity in details or detectable variations in density.

The alloy that makes the process practical is copper to which has been added about two per cent beryllium. This alloy is sometimes called "beryllium bronze" and, as a precipitationby means of hydraulic press equipment, thereby reducing the amount of porosity and increasing the density of the alloy.

Hobs for this work are made from steels with high-draw temperatures (1100 deg. F. or more) and ability to retain a minimum hardness of C-50 (Rockwell). Such alloys include No. 1 Hot-form Vanadium, Pure-ore D-C-66

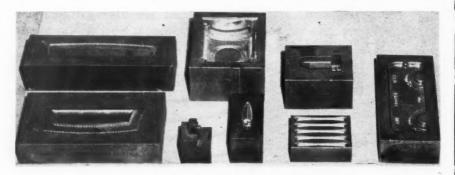


Illustration showing several beryllium copper molds.

hardening material, it is highly machinable in the annealed condition and may be heat treated for the following properties:

Tensile strength ___180,000 p.s.i.

Hardness ______C46 (Rockwell)

Thermal conductivity ______30%

Electrical conductivity ______30%

Yield strength ____150,000 p.s.i.

Yield elongation in
2 inches ______1 to 2%

Corrosion resistance _____Excellent

Normal casting
shrinkage __0.004 inch per inch

In the initial mold-fabrication operation, the molten beryllium copper alloy is usually poured around a master steel hob. Then, as cooling takes place, pressure is applied to the cast metal

Kloster, and Cro-Mow Crucible. All are air-hardening materials, and are fabricated as hobs in conformity with the following general specifications:

(A) Bases must have a minimum thickness of two inches. Two or more ½-13 holes may then be tapped in each base at appropriate bearing points, so that the hobs may be attached to platen-retainer units.

(B) Width and length dimensions of a hob block must comprise even inches. For example, a 2½-inch x 3¾-inch x 2-inch cavity block should be castable to 3-inch x 4-inch x 2-inch dimensions. If round blocks are required, dimensioning should facilitate casting in multiples of even half inches.

(C) Approximately \%-inch tolerance should be allowed on a regular parting line at the top of a hob, so that the resultant cavity face may be machined for maximum accuracy. Where irregular parting lines are necessary,



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New chaser, with holder offset to left; cutting edge up to proper working position. Reground chaser, with holder offset to right to compensate for wear; cutting edge still up to proper position.

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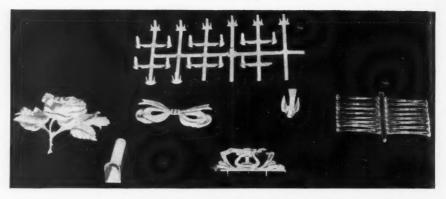
An exclusive design feature of the adjustable blade chaser is the provision for take-up of block after each grind. Chasers are always up to proper cutting position.

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The plastic products shown here were made by the injection of thermoplastic materials in beryllium copper molds.

the top dimensions should be specified for precision fabrication.

(D) A draft of 5 to 10 degrees should be allowed when details such as letters or numerals are desired.

(E) The hob should be buffed and polished for the same finish that is de-

sired in a beryllium copper cavity.

Despite the use of pressure in fabricating beryllium copper cavities, mold impressions can be readily annealed for machine finishing by soaking for three hours in an air-circulating muffle furnace at 1450 to 1475 deg.



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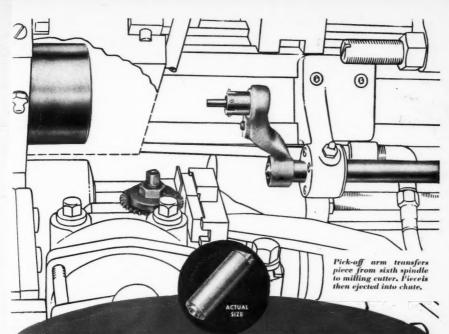
F. and then cold-water quenched.

Machine finishing, welding, soldering, and electroplating operations are sometimes required in order to add "uncastable" details to the cavities so that the latter can be used as production molds. Such details normally include gates, sprues, knockouts, core pins, and so on. Welding or soldering may be used to assemble separate cavities as multi-cavity molds, and cavity plating is desirable when mold surfaces require a special finish, for example, chrome finishes for the molding of rubber products.

When the mold is to be machined on a lathe, rough cuts may be taken at a surface speed of about 180 feet per minute and finish cuts at surface speeds of approximately 200 feet per minute. Similar speeds may be used when machining the mold on shapers and milling machines, although roughing cuts with the latter must sometimes be reduced to about 120 feet per minute surface speed. Peripheral speeds for drilling range from 30 feet per minute for large-size drills to 35 feet per minute for small-size drills; for tapping, 10 to 20 feet per minute depending upon the size of taps. Carbon steel cutting tools are recommended for short runs and Carboloy for long runs. The tools, in each case, may be lubricated with water-soluble mineral oil or black sulphurized oils.

The two parts which go to make up a beryllium copper mold may be joined together by means of both gas and electric welding processes at 1460 deg. F. If maximum strength is to be attained the mold may be reannealed in an age-hardening treatment which consists of heating to about 600 deg. F. for three hours in an electric boxtype frurnace, followed by air cooling.

If necessary, cavities can be electroplated after the final heat treatment with metals such as chromium, cadmium, silver, zinc, and so on. Average plating depth is about 0.0004 inch.



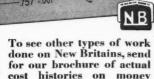
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Formed, drilled, tapped and milled on a Model 60

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Pick-off and transfer to milling attachment in sixth position makes it possible to drop off this complete piece in one operation, thereby holding down the cost of a highly competitive assembly. Because of the quantity involved, the close tolerances and the size of the piece, a second operation is out of the question.

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PERFORMANCE REPORTS...64" Cut Master on wheel job cuts time from 24 hours to 7 hours. — A new method of tooling and the speeds available on α 42" Cut Master cut floor to floor time from 1 hr. 50 minutes to 38 minutes. — Another 42" Cut Master cut job time from 1 hour 40 minutes to 23 minutes. — and yet another 42" machine improves over former method on endshields. Previously 1 piece required 1 hour 40 minutes. Now two shields are completed every 40 minutes. Let Bullard figure your jobs on Cut Master Vertical Turret Lathes. The Bullard Company, Bridgeport 2, Connecticut.



In 3 chuckings, 380 lbs. of stock was removed in 14½ hours from a stainless steel forging of this bowl shell. Such an excellent finish was obtained, that a previous polishing operation was eliminated.





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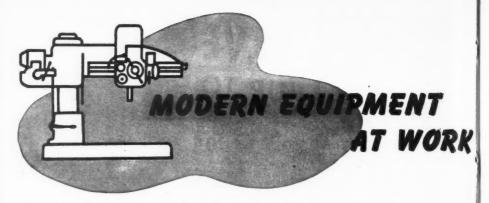
IDEAL Live Centers safeguard accuracy. Unique bearing arrangement, short overhang and precision construction let you work to closer tolerances, give you every live center advantage. Because they are a "sure shot" for lagging production and high costs, IDEAL Live Centers are a 2-to-1 favorite over all others. Get the facts today.

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Welding of Broom Machine Frame Reduces Weight and Cost

A change in the method of fabrication of frames for broom-sewing machines has been announced by the Baltimore Broom Machine Co. The frames are now being welded instead of cast as formerly, and it has been found that both the weight and the cost of the frames have been reduced.

The change to welded frames was brought about by the increased difficulty and delay experienced by the company in obtaining the cast frames formerly used, and the fact that the high cost of the castings was a major factor in the total cost of the completed machines.

Before deciding on the conversion to welded frames, it was necessary for the engineers to consider such details as the continued use of existing jigs and fixtures, the retention of the de-

sign of numerous appending parts, and the over-all practicability of a weldment. After thoroughly investigating the various design problems, the engineers designed a workable weldment using sheared or burned flat steel wherever possible and a General Electric 200-amp a.c. welder. The



A G-E 200-amp a-c welding transformer being used to fabricate a broom machine frame in the Baltimore Broom Machine Co. plant.

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WITH AIR BELT TENSIONING

The Model 6-A Air Backstand SAVES ABRASIVE BELTS — INCREASES PRODUCTION — CONSERVES FLOOR SPACE.

An abrasive belt stretches as used. If correct tension is constantly maintained the belt will last longer and maximum production obtained.

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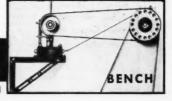
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welding equipment is shown in the illustration. The resulting welded frame was a definite improvement over the cast frame since the weight was decreased 33½ per cent and the strength was increased over the strength of the casting. The cost was also reduced considerably.

Sheffield Automatic Airlectric Machine Used for Classifying Muffle Box Parts

A N automatic Airlectric gaging and classifying machine for refrigerating unit muffle box parts has been developed recently by The Sheffield Corp., Dayton 1, Ohio. The machine is shown in the accompanying illustration. Two identical mechanisms for gaging, classifying, and stamping are incorporated into the machine; and one spindle is unloaded and loaded by the operator as a part is being checked

by the second mechanism. As many as 1,500 parts may be checked per hour.

When an operator manually places a workpiece in gaging position, the checking cycle is started automatically. A clamping device descends and properly locates the muffle box part for gaging. The average diameter of a counterbore is checked by means of a multiple orifice solid tungsten carbide spindle which is connected to a series of Airlectric gaging heads, and its classification, one of three possible of .0003 inch tolerance each, is retained by a "memory" device. At the same time, the depth of the counterbore is checked and its classification established, one of seven possible of .0003 inch tolerance each.

The final classification, one of 21, is then automatically stamped on the muffle box part by means of air operated die stamping mechanisms. A letter is used to represent the counterbore diameter classification and a numeral,

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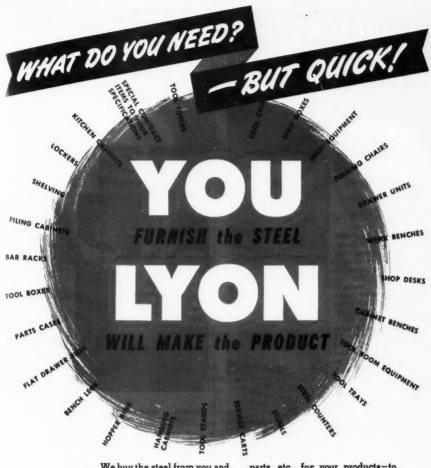
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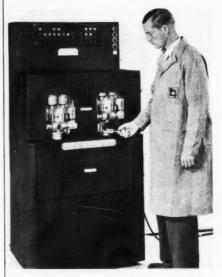
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the counterbore depth classification. If the dimensions of a bore are not within the allowed limits, the stamping device is not actuated; and the lights on the front of the machine indicate which dimension is in error.

This machine is used in conjunction with another Sheffield Automatic Airlectric machine which gages mating



Sheffield automatic Airlectric machine for gaging and classifying muffle box parts.

parts for muffle box assemblies. Parts classified by this second machine are segregated into 27 classifications; and, with all the classifications of the two parts, it is possible to make a selective fit of the parts.

Infrared Installation Used for Stress Relieving Springs

THE Johnson Spring Cushion Co., manufacturers of spring coiling machines as well as mattress springs, is now utilizing an infrared installation for the stress relieving of springs.

CARBIDE TIPPED CUTTING TOOLS
Boring Tools • Centers • Counterbores •
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Don't let anyone tell you that hardened steels must be annealed before drilling, countersinking, counterboring or reaming.

With "HARDSTEEL" drills you can produce accurate, smooth holes in steels hardened by any process—oil-hardened, water hardened, cyanided, nitrided, and they work equally well on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" drills used with standard drill presses cut costs in production shops because parts drilled after hardening always match at assembly. In service shops they save time and material and permit engineering changes calling for additional drilling to be made after parts are full hardened.

Write for a copy of the "HARD-STEEL" Operators Manual showing how "HARDSTEEL" drills are now functioning in thousands of plants in parts recovery operations.

You Harden It — We'll Drill It — with "HARDSTEEL"

"HARDSTEEL" Tool bits make faster, deeper cuts on steels and non-ferrous alloys.

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"HARDSTEEL"

The equipment was installed after a complete investigation was made by Johnson engineers and engineers of The Fostoria Pressed Steel Corp., manufacturers and designers of infrared ovens. It was necessary to determine, very carefully, the temperature and processing time required to relieve stresses in various types and sizes of



Stress relieving of mattress springs in infrared installation.

springs in order to provide adequate adjustments.

The unit, which may be seen in the accompanying illustration, consists of a motor driven conveyor designed by Johnson engineers and a heating chamber containing a battery of 32 infrared lamps installed by Fostoria. Gold plated reflecting surfaces are used behind these lamps in order to obtain maximum reflection. The springs are carried through the heating chamber in a single row. For the springs il-

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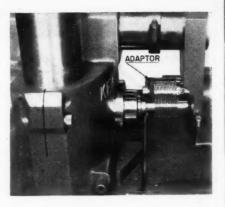
WORLD OVER

lustrated, a temperature of 500-550 deg. F. was required for the proper stress relief.

Kent-Owens Milling Machine Used for Milling Irregular Slots in Piston Rings

KENT-OWENS 2-20 milling machine equipped with an automatic indexing fixture and all necessary tooling for milling irregularly spaced vent slots in piston rings was built recently for Segments Grenier, France, by the Kent-Owens Machine Co., Toledo, Ohio. The machine may be seen in the accompanying illustration.

Sixteen piston rings are mounted on an adaptor which is placed in the indexing fixture, as shown. When the machine is started, all of the operations, including milling and indexing,

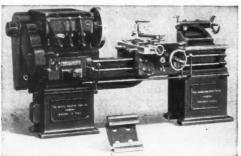


Kent-Owens milling machine designed for producing irregularly spaced vent slots in piston rings.

are carried on automatically to produce the required slots in the parts. After all of the slots have been milled, the machine returns to the loading position and stops. Extra adaptors are

NEBEL Removable Block Gap Lathes furnished in the

Geared Head Motor Driven Type, 3 Step Cone Double Back Gear Belt Driven Type or with Motorized Headstock. Especially adapted for repair and maintenance as well as for general manufacturing. Handle a large variety of work with large swing through the gap.



All Geared headstock type completely equipped with Timken Bearings, headstock completely enclosed, running in oil, with motor mounted on rear of lathe, drive through multiple vee belts and friction clutch. Standard equipment consists of: Quick change gear box, compound rest, steady rest, chasing dial, face plate, driver plate, wrenches, tool post and centers.

Furnished in four different sizes as follows: Series "LN" 18/27", Series "A" 20/30", Series "B" 22/34", and Series "D" 25/40".

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If you have been using up valuable man-hours with a handpumped press, eliminate this waste right now. Here's a speedy air-operated press that really saves production time. Actual tests show that in many instances it cuts % of the time needed for a press operation. Pressures up to 75 tons are provided by a compressed-air pump at a speed that puts a big dent in production costs.

For further information about this or any other Dake press, mail the coupon for your free copy of the Dake press catalog.



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Compact, powerful, and remarkably economical in operation, JOHNSON Hi-Speed No. 120 reaches 1500°F, in 5 minutes. Delivers 2300°F. in 30 minutes. Easily regulated. Holds temperature at desired level for accurate heat-treating any steels. Ideal for small metal parts. Gets the job done fast to save time and gas. Firebox 5x73/4x131/2. Complete with Carbofrax Hearth, G.E. Motor and Johnson Blower, Order Today!

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provided so that rings may be loaded and unloaded by the operator while the rings in the machine fixture are being milled.

The machine is equipped with a 42 x 12 inch table having a 20 inch horizontal travel. The spindle speed may be adjusted to any one of 12 possible speeds ranging from 64 to 860 r.p.m. The drive is simple and direct. A standard foot-mounted ball bearing motor is located at the rear of the machine having a vertical drive shaft, and a worm gear is attached to the end of this shaft which meshes with a similar gear on a horizontal shaft. The drive is then carried to the cutter by means of pick-off gears on this horizontal shaft. The head is mounted on two cylindrical ground steel posts, and the spindle is located midway between these posts.

Lyon Adjustable Steel-Wood Shelving is illustrated and described in a four-page three-color bulletin published by Lyon Metal Products, Inc., 1038 Monroe Ave., Aurora, Ill. The bulletin presents information on construction features and dimensions, and also depicts typical installations of the shelving. Copy of Bulletin No. 196 free upon request.

Brown & Sharpe "Electralign," an instrument for facilitating the setting of the swivel table of a grinding machine in grinding a straight shaft or exact taper, is fully illustrated and described in an eight-page two-color bulletin published by the Brown & Sharpe Mfg. Co., Providence 1, R. I. Copy free.

Gerotor Air Cylinders. The entire line of Gerotor air cylinders marketed by the Gerotor May Corp., Baltimore 3, Md., is illustrated and described in a 16-page two-color $8\frac{1}{2}$ x 11-inch catalog section published by this firm. Drawings and tables listing detailed dimensions for each model and size cylinder are provided. Cylinder mountings described include rabbet, foot, trunnion, center line, blind end flange, rod end flange, and clevis. Types and models of valves most suited to various applications are also recommended. Copy of Catalog Section No. 53 free upon request.

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Those little wheels are the result of more than 50 years of know-how and more than 1001 tests to determine the most exactly perfect combination of grain, grade, bond, shape, shank length and steel analysis to do

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Use Chicago Mounted Wheels - the first wheels ever to be mounted on their own steel shanks - today's finest.

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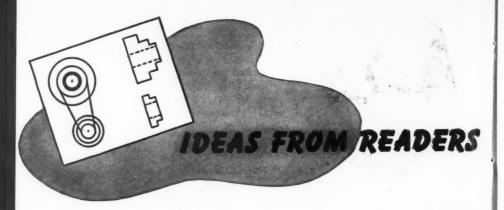


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Fixture Equipped with Electric Signal to Indicate Proper Positioning

By CLIFFORD T. BOWER

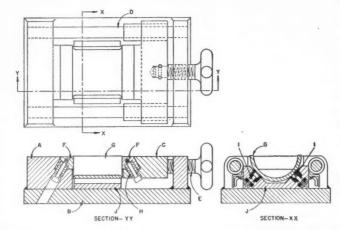
In the manufacture of semi-cylindrical half-bearing shells, the final operation is the milling of butt faces. This milling operation requires a high degree of precision since the butt faces must be perfectly parallel in order to be located in a plane passing through the bearing axis. The dimensions of each part must be accurate so that

each half may mate with any other half in the batch. Prior to the milling operation, the dimensions of each half shell are checked carefully.

So that scrap may be held to a minimum, parts should be handled carefully during the milling operation and no undue pressure should be applied when setting the shells in the milling fixture. Because of consistent improper positioning in the vee location of the former fixture, it was necessary to redesign the fixture. The new fixture incorporates special jaws to position the parts properly in the vee location and

an electrical indicator in the form of a green light signal which lights when the part is located in the proper position.

The fixture, which may be seen in the accompanying illus-



Special milling fixture for half-bearing shells featuring built-in electric positioning

tration, is of the vise type, having a fixed jaw, A, integral with a base plate, B. A sliding jaw, C moves along hardened and ground rods, D, when the screw, E, is turned. Both jaws have a sliding clamp face, F, which is moved downward as pressure is applied to the ends of the shell, G. When no pressure is applied, the clamping faces are maintained in a raised position by springs, H. A pair of electrical contacts, I, are located at each end of the vee block. J: these are hard bronze studs enclosed in machined plastic bushings for insulation. The studs are mounted prior to the final machining of the vee block so that the stud ends and the vee block sides will be in the same planes. The four electrical contacts are wired in such a manner that when the half shell is in the proper position, it bridges a gap between the contacts at each end of the vee block to connect the contacts in series—thus switching on the

signal light. All contacts must be touching the shell before the signal light will glow.

The milling cutter is operated at maximum speed with a fine feed so that there will be little strain on the shell. The clamping faces on the jaws are ground carefully, and the running clearance between the guide rods and the sliding jaw bushings is held to a minimum to avoid possible distortion of the part when it is clamped. In addition, a small diameter knob is provided on the vise screw to avoid another cause of excess pressure.

Spring-Loaded Die Stop

By ROGER ISETTS

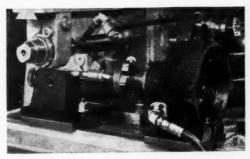
IN blanking or cutting off large steel blanks, considerable thrust is exerted against the stock stops by the cutoff punch due to the parting of metal surfaces. When solid stops are used,

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With ERICKSON'S New Speed Indexer!

Leading Auto Manufacturer Finds
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Here's a typical application of Erickson's amazing new automatic Speed Indexer: vertically mounted Speed Indexer rotates 8 position fixture. Each position holds oil pump housing for 4 hole tapping operation. This set-up is connected to automatic machine feed, and entire operation becomes fully automatic. Operator merely puts the oil pump housings on the fixture—the indexer does the rest. Result: 2400 housings (4 holes) tapped every 8 hours—formerly the production of two men, two machines.



The automatic, positive-locking, accurate Erickson Speed Indexer is the long-awaited answer to greater speed and economy for milling, drilling, grinding operations, etc. Can be mounted vertically or horizontally—adaptable to any type indexing problem. Learn how the Erickson Speed Indexer can mean higher production, lower costs on your indexing jobs.

Ask for Catalog B-2

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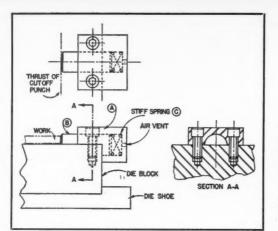
Cleveland 14, Ohio

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Drawing of spring-loaded die stop which is designed to absorb lateral thrust of cut-off punch.

this constant wedging action tends to cause the cut-off punch to wear out prematurely or, on heavy stock, the holding screw threads may be stripped or the dowels sheared. The device shown in the accompanying drawing is a suggested improvement to absorb virtually all of the lateral thrust of the cut-off punch. It is easy to make, compact, and may be used to accurately locate the work.

A cold-rolled steel rectangular block, A, forms the body of the device. It is bottom drilled to provide a slip fit for plunger B; and along

the centerline of this hole, one quarter of the block is milled away to leave the block in an L-shape so that it may fit properly over the die. Two holes are drilled and counterbored in the top surface of the block on either side of the center hole and perpendicular to it.



New for 49

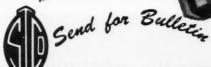
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improves finish. Standard
in sizes 1/2" to 1.1/2".



SUPER TOOL CO.

21650 Hoover Rd., Detroit 13, Michigan

5210 San Fernando Rd., Glendale 3, California

These holes receive two socket head cap screws which hold the block down securely on top of the die. A small air vent hole is drilled in the rear of the block to allow air to escape. Plunger B is a round section of hardened tool steel. One half of it is milled away to within a short distance from the end to match the L-shaped block.

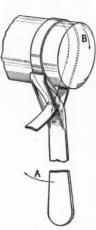
On assembly, spring C is placed in the bottom of the hole in block A. Plunger B is inserted, and the spring is compressed. The hold down screws are tightened down and spring tension keeps plunger B securely up against the edge of the die block.

A Special Strap Wrench

By E. R. YARHAM

SPECIAL strap wrench has A been designed to avoid metal-tometal contact when gripping and turn-

ing smooth cylindrical objects. The handle part of the tool is made from 11/2 x 1/4 inch mild steel strip 13 inches long. One end of the strip is bent to the form shown; and two triangular reinforcing webs are welded to the strip, one along each edge of the curved section, to maintain the curve. A slot is cut in the strip between the webs.



Strap wrench designed to grip and turn smooth cylindrical objects.

The gripping part of the tool is made of 1 x 1 inch leather strap 18 inches long. One of the straps is fastened se-



LUERS

PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

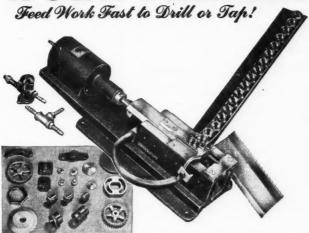
ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips - MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

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Produced under License Issued by John Milion Lucis Patents Inc.

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As-fast-as-you-can-step-on-a-button the sensational new Mead pneumatic WORK FEEDER delivers, holds, ejects small parts to be drilled, reamed or tapped. Accommodates stampings, castings, screw machine parts, etc. Adjustable to sizes up to 3". Foot or automatic control; operator's left hand is free to keep hopper loaded.

Write for new Mead AIR POWER Catalog describing "Mead Family" of air operated fixtures and devices.



curely to the handle by a small mild steel plate. The free end of the strap is passed through the previously cut slot in the handle.

The tool has a similar action to that of a pipe wrench. The leather strap is passed around the object to be gripped and pulled tight through the slot. When pressure is applied to the handle in the direction of arrow A, the looped strap is locked against the cylindrical object which is turned in the direction of arrow B.

Positive Print Cabinet

By BERT CHARLESWORTH

A simple and inexpensive printing cabinet used for reproducing small pencil tracings is described herewith. The cabinet is 27 inches wide, 21 inches deep, and 15 inches high; it will handle drawings up to 18 x 24 inches. The unit consists of a cabinet body and

a printing tray; these may be seen in the accompanying illustration.

The cabinet body and printing tray are easy to make. The cabinet body is made from % inch mild steel plate bent to shape; six R-2 fotoflood bulbs are screwed into six 115 volt porcelain sockets in the top of the body. One side of the body is provided with two hinges and a handle to allow for insertion of the printing tray. This tray is composed of a % x 1 inch steel frame, shown in the illustration, to which an 18 gauge galvanized flat tray top is screwed. Two large desk blotters are placed on the tray top to provide a "soft" base.

In reproducing a drawing, the original is placed on the blotters with a sheet of positive print paper. These are then covered with a sheet of ½ inch plate glass, 19 x 25 inches; the weight of the glass is just right to hold the drawing together and to assure sharp, clear prints. The work is placed in the



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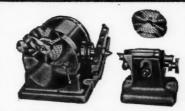
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Well built for hard daily usage. Rugged head and tailstock. Alloy steel spindle has a tapered bearing. Head tilts to 90° in vertical position. Special alloy steel worm and bronze worm wheel cut to close limits for accuracy. Complete with three index plates for dividing all numbers to 50 and even numbers to 100, with the exception of 96T. Index chart shows all divisions obtainable to 380.



Model SD 6½" Swing Universal Dividing Head for \$105.50 Smaller Milling Machines.

Available for use with this head is the L-W 5" Universal Chuck, threaded to fit.



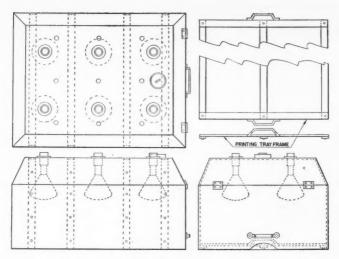
Model BP 11" Swing Universal Dividing Head for plain \$176.00 milling machines.



Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



L-W CHUCK COMPANY 28 SO. ST. CLAIR ST.



Positive print cabinet body and printing tray frame.

A Handy Boring Head

By ROBERT MAWSON

N the manufacture of textiles. guide rolls are used to direct the movement of cloth from one process to another. The guide rolls rotate on shafts

which are integral with the rolls and which vary with the sizes of the rolls. Two side fames are used to support the roll shafts in a textile machine manufactured by Collins Bros., Pawtucket. R. I. The ends of the shafts ride in holes in the side frames. For each shaft end, there is a 1/2 inch diameter reamed guide hole and a larger 3-4-5-6 inch diameter, depending on the roll diameter, shaft hole not as deep as the smaller hole. These holes, small and large, must be concentric; and the tool used to obtain this condition of concentricity is shown in the sketch herewith.

The boring head, which bores a previously drilled hole in the side frame,

cabinet, exposed for exactly one minute, and then removed. The print is washed immediately with developing solution right on the galvanized trav top-a close grained sponge is used for this quick wash-and then it is dried with another desk blotter.

I recommend this printing cabinet highly, especially to men in small shops. I also would like to caution those interested about the wiring. The six fotofloods should not be used on any one 115 volt circuit. If possible, use the shop power line stepped down, or else use two light circuits. Do not neglect to use porcelain sockets; and be sure to provide several vent holes in the top, as shown.

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This is a powerful machine for heavy or small precision work in use all over the world: Airplane Factories, Ammunition Plants, Toolrooms where fast production is desired. 4 Models, No. 16, No. 14 "EL" and Model "D." The larger the Model, the bigger the stroke and therefore more filing is performed. Furnished with or without pedestals. Constructed as per specification of U. S. Naval Aircraft Factories.

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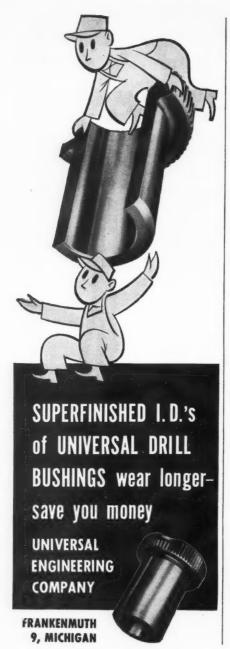
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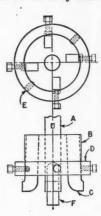
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is made with a shank, A, to fit the spindle of a vertical drill press. In the head body, B, slots are machined to hold the high speed steel cutting tools, C. A retaining ring, D, is fitted over the body and fastened to the body with

setscrews, E. A pilot, F, guides the boring tool in the ½ inch reamed hole in the frame.

The tool slots in the head are slightly tapered; therefore, by lowering the cutters in the slots, the boring diameter can be maintained after the cutting edges of the tools have been reground. The boring head is inex-



Sketch of boring head details.

pensive to make; it incorporates a simple adjustment to maintain the required diameter; and it produces good results due to its rigid construction.

Gorton No. 2-28B Plain Type Production Milling Machine with "Fullwidth" knee is covered in detail as to features and specifications in a four-page two-color illustrated bulletin published by the George Gorton Machine Co., 1712 Racine St., Racine, Wis. Copy of Bulletin No. 2321 free upon request.

Moore Die Flipper. An eight-page catalog on its diemaker's tryout and assembly machine, the Moore Die Flipper, has been published by the Moore Special Tool Co., Inc., Bridgeport, Conn. Over 20 photographs and drawings graphically illustrate how a single diemaker can quickly and efficiently test alignments of dies as large as 20 x 40 inches with 12-inch height, drill punches in place, tap for screw holes, and make visual inspection. Copy free upon request.

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SANFORD SURFACE GRINDERS

Model MG

Handles many odd size tool room and production jobs, due to its capacity of 8" x 12" x 12". Actual movements — Transverse 83/4" — Longitudinal 13" — Vertical 12" (under 7" wheel).



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A sensitive, highly accurate machine specially designed "for the job that fits in your palm." Actual movements — Transverse 4" — Longitudinal 8"—Vertical 6" (under 4" wheel).

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News of the Industry

Milford Rivet & Machine Company

Penn Rivet and Machine Company, formerly Penn Rivet Corporation, has changed its corporate name to the Milford Rivet & Machine Company, Penn Division, according to an announcement made by Fred H. Merwin, president of Milford Rivet & Machine Company. Officials expect the change to bring better coordination of sales, advertising, and general operation.

The Penn Division recently moved from Third and Huntingdon Streets, Philadelphia, to its new plant in Hatboro, Pa., a suburb of Philadelphia. Other divisions of the company are located at Milford, Conn., and Elyria, Ohio, and are known as the New England and Ohio Divisions

respectively.

Mr. Merwin has also announced the appointment of Jas. A. Sharkey, formerly manager of the Ohio Division, to the newly established office of vice president in charge of sales and advertising for the three divisions, with offices in the N.B.C. Building, Cleveland. Everett Hess, formerly superintendent of the Ohio Division, will succeed Mr. Sharkey as Ohio Division manager.

P & W Executive Accepts Post in Netherlands Mission of ECA

Alexander S. Keller, vice president and manager of foreign sales, Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., has accepted the post of senior industry officer in the Netherlands Mission of the Economic Cooperation Administration, according to an announcement made by Frederick U. Conrad, president and general manager of Niles-Bement-Pond Company. The company is granting Mr. Keller a leave of absence for approximately a year to permit him to take up this assignment.

In the capacity of senior industry officer, Mr. Keller will be the representative of the United States Government under Dr. Alan Valentine, chief of mission and president of the University of Rochester. It will be his duty to administer the industrial phases of the European Recovery

Program or Marshall Plan in the Netherland and Netherlands Indies. It is expected that after a course of orientation in Washington Mr. Keller will leave for The Hague.

Society for Experimental Stress Analysis Spring Meeting

The Spring Meeting of the Society for Experimental Stress Analysis will be held at the Hotel Statler, Detroit, Michigan, on May 19, 20, and 21, 1949. Inquiries should be addressed to the Society for Experimental Stress Analysis, P.O. Box 168, Cambridge 39, Massachusetts.

Design Service Offers Ink Tracing Service

In that the Armed Forces require prime contractors to supply ink tracings of their products for Government files, the Design Service Co., 444 Madison Ave., New York, N. Y., is offering the services of its large staff of experienced draftsmen, capable of producing ink tracings on a volume scale, quickly, accurately and economically. The company also employs a large staff of technical writers and illustrators, experienced in preparing instruction manuals that conform to Government requirements. The company is prepared to handle the entire production of a manual from research to final printed copy.

The Design Service Company employs a staff of 700 creative designers and engineers with offices located in all principal

industrial centers.

Reichert Named Acting Manager of Foreign Sales

Frederick U. Conrad, president of the Niles-Bement-Pond Co., West Hartford 1, Conn., has announced the appointment of Harry Reichert as acting manager of foreign sales for the company. Mr. Reichert will carry on the work of Alexander



- 1 Use carbide burs . . . they last many times longer . . . they work on hardened steel and stainless steel. They cut cast iron like cheese.
- 2 Use center fluted burs . . . burs having the same number of flutes over the whole bur length . . . burs with each flute precision machine ground from the solid.
- **3** Use the *half-million* trick* . . . and you'll always be sure of the safe driving speed.

Simply divide 500,000 by the number of flutes (the last number etched on the shank of every P&W Keller Carbide Bur) and you know the speed you must stay above to avoid flute chipping.

*This simple, sure calculation applies to all standard materials except stainless steel.

- USE PRATT & WHITNEY KELLER CARBIDE BURS . . . the burs that are machine ground, center fluted, the finest made . . . the burs with which you can use the half-million trick. Available in every variety of shape and cut. Write for information.
- 5 Use P&W's Bur Demonstration Service . . . whenever you have a burring problem on a tough material. We'll duplicate your setup right here in our own plant, give you performance facts and recommendations without the slightest obligation on your part.





Harry Reichert

S. Keller, vice president and manager of foreign sales, who has taken a leave of absence for a year to accept the post of Senior Industry Officer in the Netherlands Mission of the Economic Cooperation Administration.

Mr. Reichert first joined the Keller Mechanical Engineering Corp., Brooklyn, N. Y.,

as an engineer in 1925 and later became active in domestic and foreign sales work. He came to Hartford when the Keller Company was purchased and moved to that area in 1930 by the Pratt & Whitney Division, Niles-Bement-Pond Company. He was active for many years in sales engineering work on both Keller and Pratt & Whitney machines and traveled widely in the United States.

In 1945 Mr. Reichert joined the Niles-Bement-Pond foreign sales department and has been associated with this work ever since. He has made several trips abroad on company business. Recently, Mr. Reichert was appointed to membership on the Machine Tool Advisory Committee, Department of Commerce, Office of International Trade.

Did You Know? ---

Kennametal Inc., Latrobe, Pa., manufacturer of cemented carbide tools, has announced the appointment of Robert Hutchinson as an application engineer in the central district, headquarters of which is the Cleveland office at 860 Hanna Building.

Harry Crump, for the past year manager of cutting tool sales engineering, Carboloy Co., Inc., Detroit, has been named assistant to the sales manager, according to K. R. Beardslee, vice president and marketing manager at Carboloy. J. S. Gillespie, formerly in charge of wear parts sales engineering, has been appointed manager of tool and wear parts sales engineering, succeeding Mr. Crump. A. F. Dobbrodt, formerly special products sales engineer, has been advanced to manager of mining sales engineering.

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THE MIRACLE DRILL

With the Welded TUNGSTEN-CARBIDE TIP

No Drill its equal in performance

DRILL HIGH SPEED STEEL—OTHER HARD METALS AND CERAMICS — GLASS — PLASTIC

No metal too hard: DU-DRILL positively drills the hardest metals... anything between Rockwell C-35 and C-84 it finds easy. DU-DRILL cuts, it does not anneal, burn nor melt, making possible highly polished precision holes to tolerance of .0005.

No material too abrasive: DU-DRILL stands up to the most abrasive material, metal, or ceramic, as no other drill can.

(A few desirable areas remain open to qualified jobbers and distributors who are invited to make inquiries.)

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DICKERMAN AUTOMATIC DIE FEEDS ARE DOING IT DAILY!

Stop wasting time by hand feeding or using worn or obsolete punch press feeds. The modern Dickerman Die feeds may be attached to any press in any required position. They will accurately feed any Metal, Paper, Fibre,

Rubber or Plastic. Through the increased PROFITS they assure you, they pay for themselves in short order. Their moderate cost will amaze you. Rugged construction . . . no wearing parts. Many styles and sizes.

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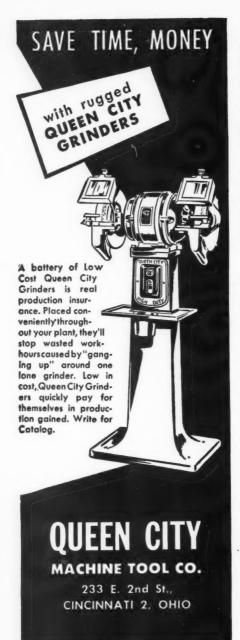
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Did You Know? ---

Milton J. Steffes has been appointed general sales manager of the Super Tool Co., 21650 Hoover Rd., Detroit 13, Mich. Mr. Steffes, who has been with the company for seven years in the capacity of field engineer and more recently in charge of the firm's carbide tool research program, succeeds Harold E. Berry who, for reasons of ill health, has been obliged to curtail his activities and is now serving as advertising manager, as well as consultant in sales.

Richards Machine Tool Company, manufacturer of "Rimat" machine tools and micrometers, will hereafter be known as Rimat Machine Tool Company, according to an announcement by James H. Richards, general manager. Coincident with the change in name, the plant and offices of the company have been moved to new and larger quarters at 1117 Air Way, Glendale I, California.

Leicester S. Lewis, vice president and sales manager of The Tabor Manufacturing Co., Philadelphia, Pa., has announced the appointment of the Pacific Graphite Co., Inc., 40th and Linden Sts., Oakland 8, Calif., as the new Tabor agency in California north of Fresno. W. C. Chedic is president of Pacific Graphite.

Fred S. Durham, president of the Bonney Forge & Tool Works, Allentown, Pa., has announced the appointment of E. S. Sensenderfer to the position of advertising manager. Mr. Sensenderfer was formerly account executive with Foltz-Wessinger, Inc., Lancaster, Pa., advertising agency.

The Norton Co., Worcester, Mass., has a n n o u n c e d the appointment of the Jeffreys Engineering and Equipment Co., Guilford Bldg., Greensboro, N. C., as distributor of Norton grinding and lapping machines, with exclusive representation in North Carolina and South Carolina.

Lionel Tinfow, well known in the industrial field as a sales engineer and for his industrial and technical background, has been added to the staff of the New York branch office of the Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pennsylvania.

The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, has appointed Philip J. Lindner, former chief engineer of the company, to head its Detroit branch sales office at 2842 West Grand Boulevard.

RAWHIDE gives you more in soft hammers and mallets. And Chicago Rawhide gives you exceptional power and maximum protection. C/R hammers and mallets absorb shock, deliver powerful blows, protect finished surfaces and stand up under tough use. For hammers and mallets that never split, crumble or mushroom, always ask for Chicago Rawhide.



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CHICAGO 22, ILLINOIS

Other C/R maintenance products are: round, flat, twist belting; belt pins and lacings; gears, pinions, gear blanks; aprons, hand leathers; hydraulic packings.

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Did You Know? ---

The Geometric Tool Co., New Haven 15, Conn., producer of machinery and tools for cutting screw threads, has announced the appointment of J. E. Haseltine & Co., 2nd Ave. and Ash St., Portland 4, Ore., with branches at 510 First Ave. South, Seattle 4, Wash., and North 1101 Division St., Spokane 11, Wash., as its distributor for the States of Oregon, Washington, Montana, and Idaho.

At a recent meeting of the board of directors of the Adamas Carbide Corporation, Edward L. Dreyer was elected vice president. Mr. Dreyer will be in charge of sales and advertising for Adamas at the company's new plant in Harrison, New Jersey.

Raybestos-Manhattan, Inc., Passaic, N. J., has announced a new Seattle warehouse and office located at 314 Occidental Avenue, where a complete stock of industrial rubber products for users in the Pacific Northwest will be carried, including conveyor belting, transmission belting, V-belts, industrial hose of all types, and asbestos and rubber packings. The warehouse and office will be in charge of Russell G. Heuman.

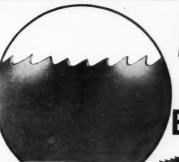
The Landis Tool Co., Waynesboro, Pa., manufacturer of precision cylindrical grinding machines, has opened a direct sales and service office in Indianapolis at 709 E. 38th Street for the territory including all of Indiana south of Indianapolis and north as far as Longansport, Huntington, and Ft. Wayne. A. J. Jones will serve as district manager.

At the year-end meeting of the board of directors of the Firth Sterling Steel & Carbide Corp., McKeesport, Pa., Floyd Rose retired as chairman of the board. Mr. Rose, who had occupied the post since October 1945, will continue as an active member of the board.

Rockwell Manufacturing Company has announced that henceforth its Pittsburgh Equitable Meter and Nordstrom Valve Divisions will be located at 25 Beale Street, San Francisco 5, California, and 1102 Delano Street, Houston 1, Texas.

The Whiton Machine Co., New London. Conn., manufacturer of lathe chucks, centering and gear cutting machines, and steam turbines, has appointed Gordon P. Molsen as sales manager of its Chuck and Machine Tool Division.





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MILFORD WAVY SET BAND SAW BLADES

records especially on horizontal band saw machines everywhere!

Users tell us... these Wavy Set blades are cutting better than 30% more metal... 50% more they say, on stainless steel... than any standard raker set blade. And cutting at closer tolerances! Why? Just three major reasons tell the story...

FIRST . . . the teeth are set into the back of the saw, which means added strength . . . and practically no tooth rippage.

SECONDLY . . . the wave helps clear the chips from the cutting area . . . resulting in straighter cutting and material increase in blade life.

THIRD... made by saw specialists... the originators of the WAVY SET BLADE... who have incorporated new principles in basic design and heat treatment.

Order from your Mill Supply He is always always ready to serve your needs, for all industrial supplies, for all industrial supplies including MILFORD back saw and band saw blades.

You owe it to yourself to test a Wavy Set blade on your own machine . . . right away.



Individually packed in cartons for easy handling.

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HACK SAW BLADES

THE HENRY G. THOMPSON & SON CO.

Saw Specialists Exclusively for over 70 Years
NEW HAVEN 5, CONNECTICUT, U. S. A.



From the start you'll notice how much faster Star Blades cut metals... and with a truer cut, that leaves a cleaner surface.

Tough, durable Star Blades lessen "time-outs" on the job, too. You see, every Star Blade is made of finest high-grade steel... precision-set teeth assure fast cutting and full side clearance. You'll appreciate the metal-cutting economies of Star Blades.

Your local jobber or distributor will be glad to help you choose a Star Blade to suit your job, ask him for the NEW Star Wall Chart for your shop... the Star Metal Cutting Book-tontain a world of useful information and are absolutely FREE.



CLEMSON

BROS., INC. • Middletown, N. Y. Makers of hand and power hack saw blades, frames, metal cutting band saw blades and the Clemson Lawn Machine.

Did You Know?---

The following executive changes have been announced by the De Laval Steam Turbine Co., Trenton, N. J.: Henry W. Johnson has retired as vice president in charge of manufacturing but continues as director and a member of the executive committee; C. Richard Waller has been named vice president and director for engineering; H. G. Bauer has been elected vice president and executive engineer; J. P. Stewart, manager, Commercial Sales Division, has been elected a vice president; W. A. Reynolds assumes responsibility for the development and merchandising of new small products in addition to his position as manager of the present IMO Pump and Worm Gear Divisions; and W. A. Neumann, Jr., has been appointed controller.

The Modern Collet & Machine Co., Ecorse, Mich., has announced the appointment of Joseph F. Lask as general manager and John L. Bradford as sales manager. A mechanical engineering graduate of the University of Budapest, Hungary, Mr. Lask has been connected with the automotive, tool and machinery industries since 1912. Mr. Bradford, a graduate of Drexel Institute, Philadelphia, in mechanical engineering, was with SKF Industries, Inc. for 12 years and since 1945 has been a factory representative with Modern Collet and Machine Company.

At a recent directors' meeting of Charles H. Besly and Co., Chicago, Ill., manufacturer of machine tools and cutting tools, the following officers were proported or newly appointed: K. Y. Taylor, vice president in charge of manufacturing, will be executive vice president; W. C. Olson, comptroller, will be vice president and secretary; Everett Addoms, formerly sales promotion manager, has been appointed vice president; and H. G. Haarz, formerly assistant treasurer, has been appointed treasurer.

Leo E. Jacobs has resigned as executive vice president and director of Charles H. Besly and Co., Chicago, Il., to become president of the Titan Abrasives Company, also of Chicago. Charles H. Besly and Company has been exclusive distributor for Titan products for over 25 years.

C. M. Murray Limited, 306 Foy Bldg., Toronto, Ontario, has been appointed exclusive representative for Hydro-Line air and hydraulic cylinders and special machinery in the provinces of Quebec and Ontario in Canada. get a finer, faster, truer



with MADISON boring tools

THERE'S A MADISON FOR EVERY BORING OPERATION.

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ROUGH BORING TOOL

This tool, in many cases, will remove as much stock in one pass as an ordinary single point tool in three passes . . . and at faster speeds.

FINISH BORING TOOL

A tool that works to close tolerances at high production speeds . . . yet still gives a superior, mirror-smooth finish.

COMBINATION BOREAMER

Combines the roughing and finishing tool in one bar . . . does the whole job in one pass of the tool. This definitely steps up production, Madisons have won a reputation for lowering hole costs through speed, accuracy, and simplicity of operation. Recently a group of veteran tool men were asked this simple question, point blank, "Why Use Madison?" Their replies, as follow, indicate several sound and basic advantages in Madisons that can't miss cutting down costs in any operation.

- Superior finishes, in many cases equaled only by "grinding." Tolerances to .0003.
- 2. More holes per cutter before regrinding.
- More regrinds per cutter (about 10 times as many as similar tools).
- 4. Faster regrind.
- Cutter may be floated in the bar bar remains stationary. No special floating holders needed.

TAKES ONLY SECONDS TO CHANGE A MADISON CUTTER

A Madison cutter may be quickly removed from the bar and set to a different diameter, or replaced by a sharpened cutter. Merely loosen screws "A" and "B", slip out old cutter, put in new cutter, tighten screws. Work is not disturbed.



Write for the new Madison Catalog



MADISON MANUFACTURING COMPANY
DEPT. MM MUSKEGON, MICHIGAN

Did You Know?---

The Billings and Spencer Co., Hartford. Conn., has announced the appointment of five new sales representatives. They are: John A. Gallagher who will make his headquarters in Cincinnati and will cover the State of Indiana, as well as southern Ohio and Illinois: Donald O. Schneider, who will represent Billings and Spencer in Pittsburgh and northern Ohio, with headquarters in Cleveland; William J. Halliday, who will make his headquarters in Collingswood, N. J., and will cover Pennsylvania, Delaware, Maryland, and part of New Jersey; Jack DeLancey, who, with headquarters in Kansas City, will cover Missouri, Kansas, Nebraska, and western Iowa: and Edwin A. Jonas who will cover the Chicago territory, operating from The Billings and Spencer Company's Chicago office.

John L. Cook, recently president of the Winter Brothers Co., Wrentham, Mass., manufacturer of taps and dies and a subsidiary of the National Twist Drill and Tool Co., Rochester, Mich., has recently been elected president of the National Machine Products Company, Detroit, manufacturer of alloy steel nuts and valve tappet screws.

Frank O. Lincoln has been elected chairman of the board of the Hy-Pro Tool Co., New Bedford, Mass., manufacturer of high speed steel commercial and precision ground taps. Before retiring in 1946, Mr. Lincoln was with the Morse Twist Drill & Machine Company for 43 years as vice president in charge of sales prior to its consolidation with the Van Norman Company.

The Lindberg Engineering Co., 2444 W. Hubbard St., Chicago 12, Ill., has established a new West Coast office at 5531 South Vermont Street, Los Angeles, which will serve the States of California, Oregon, and Washington. Stuart K. Oliver, formerly in charge of the Lindberg office in Cleveland and a former General Motors metallurgist, has been named manager.

The Link-Belt Co., Chicago, Ill., has appointed R. E. Whinrey, formerly superintendent, to the newly created position of assistant general manager of the Link-Belt Dodge plant in Indianapolis. L. C. Heinlein, formerly assistant superintendent, has been appointed superintendent of the plant, which is devoted to the manufacture of ball and roller bearings.



CECO-DROP



forges more minutes per hour, makes more forgings with fewer blows, is safer and easier to operate, costs less to operate.

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.

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Catalog No. 24 **GWILLIAM**

Ball & Roller Bearings

Select the bearings you need from the diversified line shown in our latest catalog. Profusely illustrated, and complete with explanatory text and tables, you will find the Gwilliam Catalog an invaluable aid when ordering. Representative stocks of all the various types are maintained for prompt shipment.

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THE GWILLIAM COMPANY

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T. SCHMIDT, INC. 1806 W. BELLE PLAINE AVE. CHICAGO . 13 . ILLINOIS

Did You Know?---

The appointment of M. J. L. Schulte as general sales manager of the Stow Mfg. Co., Binghamton, N. Y., manufacturer of flexible shaft equipment, has been announced by C. F. Hotchkiss, Jr., president. Mr. Schulte has had many years of experience in engineering, manufacturing, sales, and advertising in the mill supply, hardware, and automotive equipment fields.

Cornelius Van Deusen has been appointed assistant sales manager of The V & O Press Co., Hudson, N. Y. Mr. Van Deusen has been associated with V & O for the past 14 years, having served his apprenticeship in the shop as a tool and diemaker and also spending a number of years in the engineering department, later joining the sales force in the capacity of sales and service engineer.

The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, has announced the appointment of George A. Daniels as secretary and treasurer, succeeding W. C. Batchelor who has resigned after 33 years of service. Mr. Daniels has served the H-P-M Company as controller for the past two years.

Michael N. W. de Berardinis has been appointed manager of sales promotion and advertising of the Firth Sterling Steel & Carbide Corp., McKeesport, Pa. Mr. de Berardinis formerly was with the sales promotion and advertising department of Westinghouse Electric Corporation.

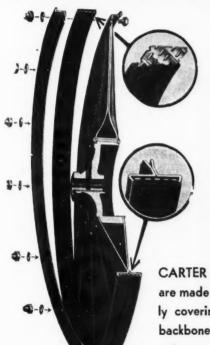
Thomas B. Moule, formerly assistant director of sales, has been appointed sales manager of the Plomb Tool Co., Los Angeles, Calif., according to an announcement made by M. B. Pendleton, president.

Frank H. Carrier, vice president of the Marvel Tool & Machine Co., St. Clair, Mich., has announced the appointment of G. Henry Keeton as exclusive Michigan representative for the sale of Marveco live centers.

J. William Ekegren, 54, secretary and treasurer of the Accurate Bushing Co., Garwood, N. J., died on December 17 from a heart condition after an association with the company since 1942.

Bruce E. Horst has been appointed sales representative in the Rockford territory for the Barber-Colman Company, handling machine tools, hobs, cutters, and reamers. He succeeds E. J. Benesch.

CARTER 30 & 36 INCH WHEELS AND QUICK-CHANGE TIRES WILL Give You Continuous Service for HEAVY DUTY HIGH SPEED PRODUCTION



CARTER 30- and 36-Inch Rigid WHEELS are designed to meet the rugged demands of heavy duty, high speed production bandsaws. No other bandsaw can equal the day-in-day-out performance of the durable, accurately machined, perfectly balanced CARTER WHEELS. Can operate up to 1800 rpms. Will save saws, material and reduce costs through uninterrupted increased production.

CARTER Quick-Change demountable TIRES are made of high-grade molded rubber, entirely covering an endless perforated, flat-steel backbone. Changed in 10 minutes or less without use of cement, glue or special tools.

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CARTER PRODUCTS COMPANY

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February, 1949

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They'll work fine in '49 and for many a year thereafter.

Motor, direct or belt drives. Pipe sizes: 3/8" to 11/2"





Specialties Co., Inc.



The Boice-Crane Metal Sawing Band Saw has 8 speeds . . . one to suit every kind of blade and to efficiently saw every kind of material. Available in bench and floor models. Strong, all-welded vibrationless steel frame.

The Boice-Crane 8-speed multiple purpose band saw is equipped with quick-change gear box and multi-groove pulley drive. An efficient speed is instantly available to the operator for cutting a wide range of industrial materials—iron and steel; brass and copper; aluminum and zinc; brake lining; plastics; building board; fiber and paper; wood and plywood. Also recommended for tool and die work. Our efficient blade butt-welder accessory makes it the equal (up to its capacity) of large dieshop band saws. Cuts up to 1" thick tool steel and softer materials proportionately thicker.

Precision-built gear box drive contains seven large anti-friction ball, needle, or roller bearings. Quick acting shift-lever and clutch disengages or engages gears. Precision-made helical gears are 1%" and %" wide and have

heavy 12-pitch teeth; transmit as much as one horse-power at lowest speed with a large margin of safety. All gears hardened and run in oil.

The gear-shift lever and V-belt are easily accessible for speed changing through a hinged, spring-latch door. Both oil-filler and oil-drain plugs also accessible through door of drive compartment.

The gear-box unit and motor are both housed entirely within the base cabinst and thereby efficiently sealed off from destructive dust and grit.

Throat Depth: 13½"
Clearance Under Guide: 8%"
Table: 15" x 15½". Tilts 45° right, 10° left.
Blades: 3/16" to ¾" wide.
Speeds: R.P.M.'s—1120, 890, 660, 450, 70, 50, 35, 25

Ft. per Min.—4100, 3260, 2420, 1650, 250, 183, 125, 192.

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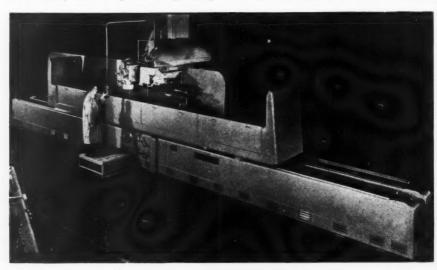


Thompson Heavy Duty Type CX Hydraulic Way Grinder

Designated as the Type CX, a heavy duty 30 x 48 x 196-inch hydraulic way grinding machine has been added to the line of large heavy duty surface grinders manufactured by The Thompson Grinder Co., Springfield, Ohio. The model illustrated has a 46-foot bed length and is designed for grinding the ways of large type lathes rapidly and with maximum precision. The machine is equipped with an auxiliary vertical spindle for grinding

safety gib, clamp surfaces and rack seats on the machine bed. Lathe bed ways are ground with the horizontal spindle using a grinding wheel trued to the proper angle for vees and flats. The working capacity of the horizontal spindle is 240 inches.

Custom designed to meet requirements of specific jobs, the Thompson Type CX Grinder features massiveness of construction, exemplified by the heavy base and single column. The column alone weighs over 10 tons. The heavy rib construction throughout the base is claimed



Thompson Heavy Duty Type CX Hydraulic Way Grinder

Starrett **HACKSAWS**



BAND SAWS

for Cutting Metal, Wood and Plastics



"5-M" MOLYBDENUM for hand sawing and for light and heavy power sawing, these blades are of special temper for high speed cutting and for hard metals. They have a remarkable record of performance and low cost

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HIGH SPEED STEEL 18-4-1 Tungsten all hard blades for light and heavy power sawing to assure fast production on high alloy metals, stainless steel, phosphor bronze, tool steels, chrome steel, Monel metal and the



SAFE - FLEX for hand sawing - a high speed steel blade with hard edge and flexible back, a combination that makes it virtually unbreakable on the toughest hand sawing jobs.



STANDARD Flexible Back, All Hard and "Semi-Flex" in the right size and teeth per inch for hand sawing jobs of all sorts. Fast cutting, long lived, thoroughly reliable.



METAL CUTTING BAND SAWS with hard edge and flexible back, available in 10 widths, 3 gauges and 8 pitches, in coils of any desired length, or cut to length and welded ready to use.



"SKIP-TOOTH" BAND SAWS for fast cutting of magnesium, aluminum, bronze, soft brass and other nonferrous metals; also for special compositions, fibre, bakelite; plastics and wood.

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THE L. S. STARRETT CO. . World's Greatest Toolmakers ATHOL, MASSACHUSETTS, U.S.A.

to provide a rigid foundation free from distortions and to assure permanent accuracy under continuous heavy duty grinding operations. The high powered super precision wheelhead and slide unit is mounted on the single massive column which has large rectangular ways and ample ratio of length to width of bearing span to assure extreme accuracy throughout the complete range of movement of the wheelhead unit. The flame hardened wheelhead slide ways are precision ground for permanent accuracy and protected by Neoprene bellows covers.

In spite of its massiveness, the machine is said to be easy to operate and simple to control. Two levers provide for control of the entire hydraulic movement of the table and wheelhead units. An anti-friction elevating nut permits accurate feeding of the wheelhead to 0.00001 inch. Controls are grouped at the normal position of the operator and hydraulically balanced for finger-tip actuation. Table and wheelhead feeds are hydraulically operated. Table speeds are variable between 10 and 100 feet per minute with a single lever control. Fast operation with heavy table loads is said to be accomplished without shock or dwell by means of a patented valve having simple micrometer adjustments.

An automatic feed to the wheelhead. acting at each reversal of the table, is easily adjustable within limits. Hydraulic rapid traverse is 240 inches per minute, and hydraulic wheel truing speed is 6 inches per minute. The wheelhead unit is powered by a 30 h.p. motor mounted directly on the wheelhead. The spindle is of alloy steel, Magna Fluxed, ground and lapped, and operates on silver lined bearings having an absolute minimum clearance. Automatic lubrication is provided by a pressure pump interlocked with the spindle motor.

End thrust is said to be accurate to 0.00001 inch due to a specially constructed shoe type pressure lubricated thrust bearing. This design is claimed to provide for rapid stock removal and fine

finish to very close limits.

H-P-M 100-Ton Fastraverse Single Action Press

Designed for the rapid deep drawing and forming of sheet metal, the H-P-M 100-Ton Fastraverse Single Action Press shown herewith has been developed by The Hydraulic Press Mfg. Co., 1048 Marion Rd., Mount Gilead, Ohio. The ma-



RC-5

No. FC-28

The REDMER INDEX CHUCK has twelve indexing positions and Collet capacity 1/16" to 2". REDMER CHUCK can be had with either Index Collets or Standard Brown & Sharpe type collets.

V-29

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The REDMER FOOT CON-TROL AND VALVE was developed in order to meet a demand for an AIR VALVE & FOOT CONTROL LOW IN Cost but constructed to surpass the high priced Valves.



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Small Tools. THE CLEVELAND PUNCH & SHEAR WORKS COMPANY Cleveland, Chio NEW YORK . CHICAGO DETROIT PHILADELPHIA PITTSBURGH

February, 1949

MODERN MACHINE SHOP

Reduce Set Up Time Specify SEIBERT Adapters

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Precision Adapter Assemblies. Morse Taper, Stub Taper and Extension Adapters.

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Arms, Standard Slip and Bracket Type Spindles, Lower Drives, Pinion Drive Shafts, etc. Prompt Delivery.

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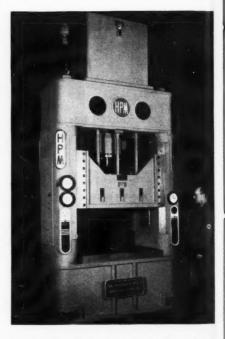
Manufactured by

Seibert & Sons, Inc. East Peoria 8, III.

CARROLL 12 Speed Geared **Head Motor Drive IAMIFSON** Timken Mounted Spindle. LATHES Modern Design-Liberal Dimensions. Write tor Bulletin.

chine is an all-hydraulic self-contained unit with a 48 x 36-inch platen, 30-inch daylight, and 18-inch main ram travel. Located in the press bed is a 33-ton hydraulic die cushion with a 32 x 25-inch platen and 7-inch stroke.

The press frame, a combination of castings and weldments that is said to assure maximum strength and rigidity, consists of a head and bed, spaced by a pair of uprights. Two preloaded tie rods passing



H-P-M 100-Ton Fastraverse Single Action Press

through each upright lock the assembly together as one solid unit. The uprights are accurately aligned with the head and bed by special circular keys. The head incorporates a hydraulic cylinder with power ram which actuates the main slide. This slide is guided by beveled ways on the four inner corners of the uprights through adjustable gibs, so positioned as to oppose any twisting of the slide. Three mechanical knockouts are built into the main slide.

The press is arranged to close and open at a rate of 770 inches per minute. It automatically reverses at a predeter-

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Press mbly

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work requiring hammer action.

Made by STANLEY the greatest name in tools

Stanley Electric Tools - New Britain, Conn.

No. 310A ELECTRIC HAMMER-

11/8" capacity . . . Drills, chips, chan-

nels, chisels, scales, vibrates . . . any

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mined setting and slows down prior to die contact. Pressing speed under full load is 146 inches per minute. Operating with a 12-inch working stroke and building up a pressure of 100 tons on a solid surface, the press is said to cycle approximately 20 times per minute. The maximum pressure can be obtained at any point within the limits of the ram stroke. Both speed and pressure can be easily adjusted.

The press is equipped with an H-P-M closed circuit operating system and is powered by a 40 h.p. electric motor directly connected to an H-P-M radial piston type pump. Oil is used as the hydraulic

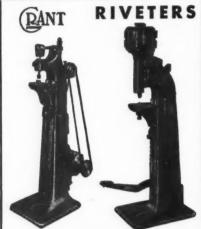
pressure medium. Only one hydraulic pump is required for operating the press slide and die cushion.

Three methods of operation are provided; namely, manual, semi-automatic and full automatic. Change-over from one method of operation to another can be quickly effected by the operator at the electric control station. For quick and easy die setup, a manual precision travel control is provided. The press operates only as the hand control is turned so that dies may be gradually eased together.

"Tri-Tec" Universal Drilling Machine

Known as the "Tri-Tec," a universal drilling machine which is designed for group or pattern drilling, reaming, and tapping holes at any required angle is now being manufactured by the Onon-daga Tool Corp., Fayetteville, N. Y. As shown in the accompanying illustration. the machine consists essentially of a cylindrical base to which a number of arm supports are attached. These supports are adjustable radially into any desired position. Each support carries an arm. adjustable vertically, and on each arm a drill head may be mounted. These heads are adjustable toward or away from the center of the machine and are equipped with swiveling supports to allow for angular adjustment from 45 degrees above to 45 degrees below the horizontal.

The pieces to be drilled are located in suitable jigs, chucks, or collets mounted on a faceplate which rotates on a spindle passing through the center of the base. Geared to this shaft is an index plate having a number of holes corresponding to the number of holes to be drilled in one revolution of the spindle. Also attached to the spindle is a drum in which holes are drilled to correspond to the desired



 Pioneers in the riveting field. Head rivets from smallest to %" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't iorget to send samples.

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FASTER TUBE AND PIPE CUTTING

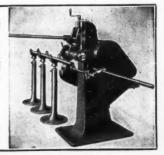
STEEN High-Speed pipe, tube and column cutoff machines embody unique design and rigid construction features to greatly step up cut-off operations. Available in three sizes to cut diameters 1/8" to 3"; 1/8" to 6"; 3" to 12".

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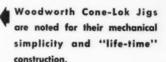
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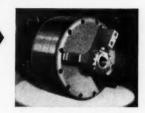
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CONE-LOK JIGS

Chucks engineered and built by Woodworth guarantees the ultimate in precision gear chucking.





DIAPHRAGM CHUCKS



PRECISION GAGES

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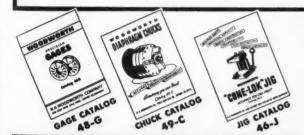
Woodworth manufactures a complete line of thread ring and thread plug as well as cylindrical plug and ring gages. Also produces special gages to customer blueprints.

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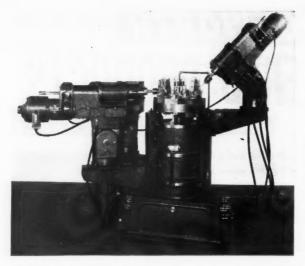


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New, comprehensive catalogs on N. A. Woodworth chucks, jigs and gages. Precision parts data supplied upon request for specific information. All inquiries should be on your company letterhead and mailed to address below.

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PRECISION GAGES . DIAPHRAGM CHUCKS . CONE-LOC JIGS . PRECISION PARTS



pattern or grouping arrangement to be drilled in one revolution. Mounted on a support bracket in the base of the machine and covering the surface of the drum is a group of switches. These

switches are actuated when the proper hole in the drum comes in contact with the switch arm. When the switch is closed, a solenoid is actuated, causing a switch or valve to be opened and the drill head to move forward, drilling the desired hole. As the drum continues to rotate, other switches are actuated. causing the corresponding heads to operate and complete the operational pattern.

An interesting feature of the machine is the

tool torque control which is designed to pick up any excess torque pressure applied to the point of the tool and transmit it to a reversing mechanism. This brings the tool out of the workpiece,



This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre... at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. $4\times361/4$ " band. The ideal portable unit.

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GEO. T. SCHMIDT, INC.
1806 W. BELLE PLAINE AVE., CHICAGO 13, ILLINOIS

allowing it to clean itself. The drill then advances rapidly to the depth to which it had penetrated and slows down to drilling feed before starting to cut. In this manner, the machine can be used for deep hole drilling where it may be necessary to clear the drill several times.

Gorton No. 2-28B Plain Type Production Milling Machine

For heavy milling cuts and for maximum performance with carbide cutters, the George Gorton Machine Co., 1712 Racine St., Racine, Wis., is offering the Gorton No. 2-28B Plain Type Production Milling Machine illustrated herewith. A full 10 h.p. is delivered to the spindle through a simplified and highly efficient gear train. An entirely separate motor is used for longitudinal, cross, and vertical power feeds.

The No. 2-28B features a "Fullwidth" knee firmly mounted on the machine column by a square lock bearing of generous width. The bearing on the top of the knee is almost as wide as the saddle is long, thus assuring maximum rigidity under the heaviest cutting loads by pro-

viding support to the workpiece. In addition, a narrow center guide is provided on both the column and knee to afford a positive guard against tipping of the knee and "cocking" of the saddle.

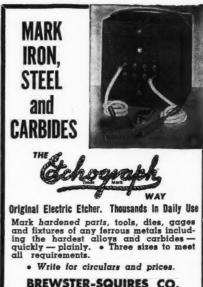
The saddle has a bearing spread on the knee almost equal to the table travel, thus preventing sag when the table is fully run out, it is claimed. The saddle is further strengthened by four heavy ribs. The cross-feed bracket is part of the saddle casting. The design of the saddle also includes a totally enclosed coolant channel.

The column of the machine is a massive one-piece structure. The spindle motor is totally enclosed in the column base, being inserted through a small service door on the left-hand side and mounted parallel to the spindle. Three-way ventilation is provided for the motor, belt, and pulley.

The balanced spindle of the No. 2-28B is designed to provide mass and weight of metal close to the spindle nose. Tapered bearings are provided at the front and center of the spindle and a radial roller bearing is used at the rear.

All controls of the machine are closely grouped at the front of the knee for operator convenience; all are full directional. Lubrication for the spindle, gear





17 Washington St.

Tenafly, N. J.



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★ Every tool is precision designed, engineered and built to perform efficiently in its field on the widest possible variety of work. Flexible, adaptable . . . economical to use . . . efficient because based on practical experience. Priced to fit into your equipment schedule for 1949.



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Adjustable to Wheel Wear

★ Heavy duty ball bearings, enclosed in dustproof boxes, support heavy one-piece, alloy steel spindle. Push button control with overload protection. Semisteel wheel guards are hinged door type. ADJUSTABLE TO WHEEL WEAR. High-grade chrome-manganese alloy steel spindle is provided with positive shaft-locking device for holding shaft while renewing wheels.

★ Standard equipment includes adjustable tool rests, eye shields, straight flanges, water post and tool tray on 2 hp. and 3 hp.

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ELECTRICAL TOOLS IN STOCK



MODEL 10 for 12" to 20" wheels

The UNITED STATES ELECTRICAL TOOL Co.

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MODEL CC 3D

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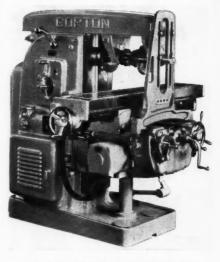
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Engraves an area 5 by 5 inches on curved surfaces without special templates, with smooth lines in any design, number, letter; on iron, brass, copper, aluminum, soft steels and all plastics. • Drills a series of holes • Profiles small parts • Increases accuracy and production • Works from original drawing or templates • Etches glass and similar items • Will not cause distortion. For information and prices write Dept. M.

Consult your distributor or

AUTO ENGRAVER CO., Inc. 1776 Broadway New York 19, N. Y. train, and speed box is provided by a pump and reservoir in the column. Lubrication for gearing in the knee, elevating screw, and column bearing surfaces is provided by a separate pump and reservoir in the knee. An additional pump and reservoir in the saddle provides lubrication for the table and saddle bearings, table screw drive elements, crossfeed bracket, cross-feed screw, and table screw nuts.

A motorized centrifugal coolant pump is located at the right rear of the col-



per

NSP

PR

Gorton No. 2-28B Plain Type Production Milling Machine

umn base, directly coupled with a coolant reservoir in the foot of the column. A totally enclosed and simple coolant return channel conducts coolant from the machine table to the reservoir in the base. A fully adjustable coolant nozzle provided directs coolant at any desired angle and can be readily turned off and moved out of the way.

A self-contained control cabinet is mounted on the right-hand side of the machine column. The spindle motor reversing switch and coolant "on-off" switch are located on the right-hand side (rear) of the cabinet. The spindle can be instantly stopped through the electrical braking action of a zero speed switch. Either the "stop" handle on the front of the knee or the "run-stop-jog" buttons on the left-hand side of the column may be used to control the spindle.

HEAT TREAT

SMALL PARTS, TOOLS

In Your Own

- Install anywhere by simple wire connection Quiet in operation. No fumes or odorsno ventilating required.
- Any intelligent man can operate furnace with automatic temperature control, using established procedures.
- Operating cost under 4¢ per hour to hole 1600° F. in Model 3 furnaces, with 2¢ pe kw.-hr. rate. Others in proportion.

NOW YOU CAN heat treat, harden and tempe small parts in your own plant . . . without ex perienced heat treaters. Economical to install and use, Cooley Electric Furnaces operate efficiently at high or low heats, and save your large furnace time for work requiring large volume capacity Here are some profitable uses:

PRODUCTION HEAT TREATING of small part . Small batches . . . Running pilot lots to pre determine mass production techniques . . . Emer gency repairs . . . Industrial and laborator, testing . . . Miscellaneous controlled heating jobs

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CHAMBER	8"W 6"H 14"L	10"W 6"H 18"L	8"W 6"H 14"L
MAX. TEMP.	18500 F.	18500 F.	20000 F.
AMPERES	14.8 at 230 v.	19.6 at 230 v.	20.2 at 230 v.
WATTS	3400	4500	4650
MODEL*	MH-3 VH-3 MK-3 VK-3	MH-4 VH-4 MK-4 VK-4	VK-5 VK-6
PRICE	200.00 230.00 250.00 280.00	295.00 325.00 345.00 375.00	420.00 340.00

- * M models complete with hinged door and hearth plate.
- models have counterweighted vertical lift door.
- K models include Selective Power Modifier for input control to correct temperature lag.

ACCESSORY EQUIPMENT
Electronic operated Veri-tron indicating and controlling \$143.00 pyrometer, with thermocouple and lead wire. Same in self-contained, enclosed panel including line switch and fuses, with steel stand-completely wired..... 273.00 50.00

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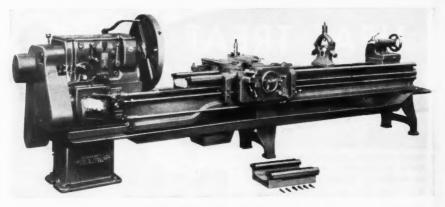
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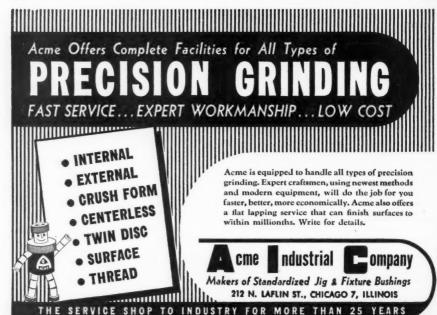


Standard Fixed Gap Bed Cintilathe

Fixed Gap Bed Cintilathe

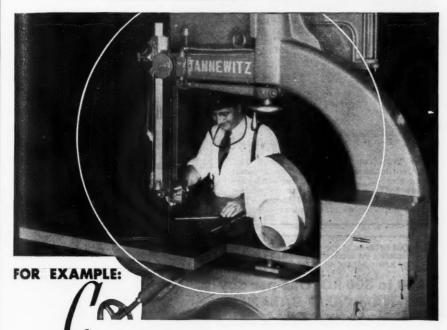
Cincinnati Lathe & Tool Co., Cincinnati 9, Ohio, has announced a Fixed Gap Bed Centilathe intended to meet the demands of the repair and jobbing shop group requiring an extremely versatile engine lathe in medium and light duty types.

The Standard (medium duty) Fixed Gap Bed Centilathe is offered in six nominal swing sizes of 14, 16, 18, 20, 22, and 24 inches with distances between centers from 30 inches and up in increments of 24 inches. Motors supplied as standard are as follows: 14-inch, 3 h.p.; 16-inch, 5 h.p.; 18-inch 5 h.p.; 20-inch, 7½ h.p.;



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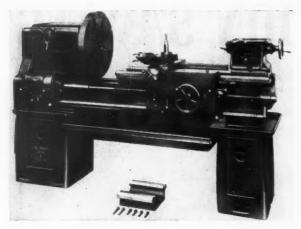


UTTING side panels of a barometric damper as shown above. Cost of dies required for seven sizes would have approximated \$12,000—a prohibitive sum for volume required on these sizes. Frictionsawn on a TANNEWITZ High Speed Band Saw in multiples of two in 1.2 minutes each — a very moderate cost which makes feasible the complete line required. Cost of machine was only a small fraction of cost of dies contemplated and it is also available for many other uses.

For trimming castings, formed parts, cutting metal as hard as a file and dozens of other operations, too, friction sawing with TANNEWITZ High Speed Band Saws offers tremendous advantage. Write for free booklet, "FRICTION SAWING."

THE TANNEWITZ WORKS GRAND RAPIDS 4

rs of rd



Tray Top Fixed Gap Bed Cintilathe

2 h.p., and 18-inch, 3 h.p. The carriage on the Standard, as well as the Tray Top lathe, is provided with short wings on the headstock end. The wings on the tailstock end are generously extended to provide an adequate bearing surface on the bed as well as the necessary rigidity to the entire carriage unit. The short wings on the headstock end of the carriage provide for a maximum approach of the tool to the gap with a minimum of overhang in the gap.

22-inch, 10-h.p.; and 24-inch, 15 horse-power.

The Trap Top (light duty) Fixed Gap Bed Centilathe is offered in two nominal swing sizes of 15 and 18 inches with distances between centers from 18 inches and up in increments of 6 inches. The motors supplied as standard are 15-inch,

Hill Pneumatic Riveting Machine

For high speed production riveting, the Hill Machine Co., Box 667, 1032 Mulberry St., Rockford, Ill., is offering the Hill Pneumatic Riveting Machine shown

CASE REPORT No. 51 from a series of actual cases recording the successful application of BEAR DY-NAMIC BALANCING to Industry.

250 to 300 ROTORS per day

on the Bear Balancing Machines at Pezzillo Pump Company. Benefits of Dy-Namic Balancing which they report, can be yours, too, when you use Bear Machines to balance rotating parts. Select the machine that fits your need, from the new

FREE MANUAL tells how to BALANCE ALL ROTATING PARTS

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AND PROGRESSIVE DIE

With the use of a Producto 4 Post Die Set and modern die design, the Trumbull Electric Manufacturing Co. has stepped up production, increased accuracy and cut unit costs. The operations of this particular die include...cut box corners, pierce holes, cut knockouts, bend, form welding projections, set back knockouts, and cut off. (One other operation finishes box forming.)

Material: Coiled 10-9/16 x 16 ga. C.R. steel is hand fed to die from automatic coil cradle. Tolerances of \pm .005 are held in some cases, and slightly higher on other operations. Die size: 23-3/4" x 18". Press: 160 ton Bliss.

Through the complete manufacturing cycle Producto Standard and Special Die Sets are held to the strict requirements established for every phase of machining. When your set is ordered from "Near Neighbor Service," there's no lost motion... no red tape. Shipment is fast... plus values built into your sets assure long, low-cost service life. Specify PRODUCTO.

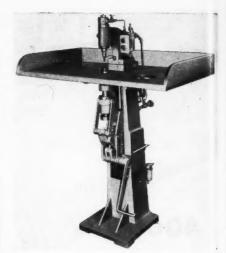
THE PRODUCTO MACHINE COMPANY

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herewith. The machine consists essentially of a high speed air-operated reciprocating hammer operating vertically toward a sturdy anvil mounted adjustably in a strong bracket. This mechanism is supported by a compact open box type of cast column with a heavy base and a rigid head casting. The air lines, valves, controller, and other equipment are mostly mounted inside the column.

The hammer spindle is automatically rotated during its oscillation by a small air motor on top of the piston housing. If the work requires, the air motor can be removed and the splined piston locked



Hill Pneumatic Riveting Machine

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against rotation by a supplementary guide collar. The speed of rotation of the hammer spindle is adjustable by a valve on the supplementary air line serving the motor. The rotating motor operates only when the hammer is operating.

The anvil of the machine is made in two types—stationary and elevating. Both types are fully adjustable since the anvil support brackets are clamped in a long slot on the front of the column. The anvil post is threaded at its bottom end and includes two heavy lockable capstan-type positioning nuts for the fine adjustment of the exact anvil height.

Two types of work tables are available for the Hill Pneumatic Riveting Machine. One is a small 6½ x 6½-inch cast iron work table which can be set over the top



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Designed to provide a quick and easy method of selecting mechanical and hydraulic presses for blanking, drawing and forming jobs. Gives correct speed for particular stroke and metal being worked. Developed by Len Crary, Staff Engineer, E. W. Bliss Co. Endorsed by National Tool and Die Mfg. Association, Pressed Metal Institute and adopted as standard by the press industry. Thousands in use. Calculator is 9½," square. Made of durable Vinylite. Complete with 70 page handbook of press data and leatherette case. Write for illustrated folder.

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- · A NEW NAME-"ROTARY BROACH" *

ROTARY BROACHES may be used in lathes, turret lathes, automatics, drill presses, etc., to replace reamers. They produce perfect holes with finishes that can only be compared to honing. They last longer before grinding is necessary and may be resharpened 10 to 30 times. They produce perfect holes at a fraction of the cost of those produced by other methods. Eliminates grinding, lapping, honing and boring.

USE THIS NEW MACHINING METHOD-ROTARY BROACHING* You Cannot Afford Not To Use Rotary Broaches (Write for free descriptive literature) * "Rotary Broach" and "Rotary Broaching" are new names coined and copyrighted by Shearcut Tool Company.

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t. able of the anvil post. This type is generally supplied on machines having a stationary anvil. The other table is a 40x24-inch plywood unit which is attached to the column and has a clearance hole for the

anvil post.

The machine features a hammer piston which is threaded to accommodate all standard types of peins. The design also features an automatic timer which is said to be particularly useful on piece work. Standard equipment of the machine includes an air filter, pressure regulator, pressure gage, aspirating type oiler for the hammer piston, air motor for hammer rotation, and control valves.

Reed A32 Cylindrical Die Thread Roller

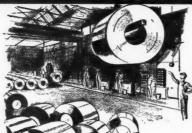
The Reed Rolled Thread Die Co., 237 Chandler St., Worcester 2, Mass., has developed the Reed A32 Cylindrical Die Thread Roller illustrated herewith which is designed to provide for the rolling of thread diameters from % to 4 inches. The machine is of the horizontal type and is compactly constructed so as to occupy a minimum of floor space. The work blank is supported and positioned horizontally between three synchronously rotating cylindrical dies which act on the blank simultaneously and hold it rigidly in the

proper rolling posi-

tio

A Shining Example of JEWEL POLISHING!

THESE GLEAMING ROLLS of stainless steel were polished with especially developed Jewel Silicon Carbide paper belts...belts that cut faster and last longer, because the abrasive is



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The rolling prescauses the sure material to follow the pattern of the dies, which always remain in match during rolling so that thread form and lead are controlled to close limits. Control of work dimensions is accomplished positive adjustments for diameter, length, and taper. Adjustable scroll rings in the head provide for approximate setting of the dies, while the final sizing of the work is said to be easily obtained by a micrometer adjust-Rugged ment. stress rings provide support close to the work, thus assuring permanence of setup for continuous production of parts to gage limits, it is claimed.

High quality surface finish, regardless of material, is said to be obtained by the rolling burnishing action of the smoothly finished cylindrical dies.

The penetration



Obviously, the pressure exerted by a clamp is not the same along the entire length of the toggle bar. Close to the

Model S-1100 is used in this example. Similar variations in pressures are found in all other models. Every clamp has been laboratory tested.

mounting base, the pressure is the greatest. As the spindle is moved out toward the end of the bar the exerted pressure becomes less.

When selecting a clamp, make sure you get the one whose toggle bar is capable of safely meeting the pressure requirement for the particular spindle location needed.

KNU-VISE PRODUCTS

LAPEER MANUFACTURING CO.
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Reed A32 Cylindrical Die Thread Roller

rate of penetration, predetermined length of dwell, and positive duplication of size. A wide range of die and cam speeds in conjunction with interchangeable cams allows for desired cycle of squeeze, dwell, and release that may be required for different materials, work, and thread or form specifica-The drives that rotate the dies

and control the feed are independently operated by individual motors. Separate jogging push-button controls for both die rotation and feed provide for flexibility and simplicity of setup and operation. Manual and semi-automatic feeding with continuous or single rolling cycles are availabile. The

machine may also be arranged to provide for the through-feed rolling of continuous threads if the user so desires.

of the dies is controlled by a mechanical feed using a positive cam action that is claimed to ensure a definite and controlled

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LMOST without exception, the hydraulic A cylinder you need to fit even your special applications can be found as a standard unit listed in the big 52 page Hannifin catalog. This is your key to LOWER COSTS . . QUICKER DELIVERY...SUPERIOR PER-FORMANCE. The Hannifin line is complete! All standard and combination mounting styles . . . bore diameters, 1" to 8" . . . any length stroke...standard, double end, or heavy duty (2:1) piston rods . . . with or without cushions.

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At long last Vlier offers a Torque Thumb Screw, which tool engineers can set themselves, offering a range of 5 to 50 pounds constant end pressure.

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End pressures automatically limited, provides accurate holding tension. No work distortion, costly rejects, or expensive fixture rework. Individuelly boxed. 17 sizes offer various types and end pressures.



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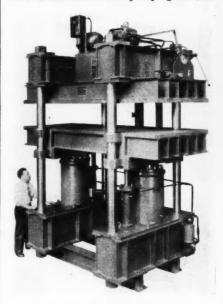
These mighty midgets of industry provide positive, accurate unitized spring-tension plunger action required on jigs, fixtures and die works. Accepted as the standard. Saves hours of labor.

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Manufacturers of Production and Tool Specialties 4552 BEVERLY BLVD., LOS ANGELES 4, CALIFORNIA

Wood HydroLectric Forming Press

Especially designed for the forming of special signs, the Wood HydroLectric Forming Press illustrated herewith has been brought out by the R. D. Wood Co., Public Ledger Bldg., Philadelphia 5, Pa. Adjustable in tonnage between 85 and 350 tons, the press is furnished complete with a motor-driven pumping unit, control valves, and piping, with pump volume and press speeds adjustable from zero to maximum. The pumping unit, especially significant to the pumping unit, especially significant to the special sig



Wood HydroLectric Forming Press

sentially composed of a 14.7 g.p.m. 2,000 p.s.i. radial piston pump driven by a 15 h.p. electric motor, is mounted on the top platen.

The press is available in models, sizes, and capacities to meet all requirements.

Motch & Merryweather No. O-H Circular Sawing Machine

For sawing stock up to 4 inches round or square, The Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, Ohio, is offering the Motch & Merryweather No. O-H Circular Sawing Machine shown herewith. All controls of the



team up to "skin" the dust problem in this leather working plant

In modern leather working plants skins are shaved and buffed to uniform thickness. It's a dirty, dusty job that liberates large quantities of abraded leather particles. To solve this problem, and eliminate the complicated piping of a central system, one manufacturer called on Torit. The results are pictured above.

In this installation two Torit No. 19-FM Dust Separators are connected, through one collecting pipe, directly to the machine. They run only when

the machine is operating and collect the dust so efficiently that a subsequent cleaning operation has been eliminated.

In industry after industry Torit Dust Collectors are solving the dust problem. If you have dust conditions in your plant, get full information and the latest Torit catalog by writing:



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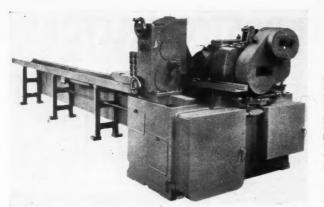
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Motch & Merryweather No. O-H Circular Sawing Machine

machine are so located as to be easily accessible to the operator. Cutoff length is set on a built-in scale (with micromatic adjustment) on the intake side of the machine, with the cutoff pieces being held to very close tolerances on either automatic or manual bar feed, it is claimed.

A single hydraulic pump supplies pressure for automatic stock feed, stock

clamping, and headstock feed, all operations being sequenced hydraulically for safety of tooling. The hydraulic sumpiscompletely enclosed and all units are readily accessible for ease of adjustment.

The saw head has four saw blade speeds (by gearshift lever), with a choice of speed ranges for either

ferrous or non-ferrous metals. Stock is clamped vertically on both sides of the saw blades. Ample chip space, with provision for easy chip removal, is incorporated in the bed of the machine. An impeller type coolant pump is mounted outside the machine which is also available in other models for the sawing of stock up to 114, 6, 95%, and 161/4 inches in diameter.

ACCURATE WITHIN

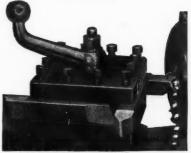


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Re



SCHAUER speed lathes

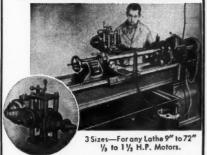
Users report savings of from 30% to 90% in secondary finishing costs when Schauer Speed Lathes are used. Learn how you can use these low-cost, high-production machines. Save with Schauer.

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• ORIGINATORS OF TODAY'S SPEED LATHES 2060 READING ROAD • CINCINNATI 2, OHIO, U.S.A.

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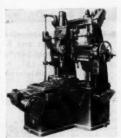
You Step-up Production, Reduce Costs and get a Higher Quality Product with Finer Finish because this borer is a high-precision Swiss machine. Its automatic features are capable of fine adjustment with highest possible accuracy. Result: increased production, a perfect finish to the closest limits, and longer life for the tools. But this is only one of the ways you save money!

You save money in first cost on this Swiss jig borer because you buy direct from this manufacturer. Not only is this important Swiss tool priced no higher than corresponding domestic tools, size for size and capacity for capacity, but, because this manufacturer maintains its own sales offices in the United States, many extra charges are eliminated, making it possible for you to obtain this precision Swiss jig borer at astonishingly reasonable

Model 4C illustrated, with 18 spindle speeds from 45 to 2,000 R.P.M., provides the correct range for all jobs

up to the maximum drilling capacity of 1½". Six automatic feeds of the boring spindle from 0.0008" to 0.0080" per revolution operate when rising and descending.

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Stabilized measuring
screws of special heat
treated steel, equipped
with corrector bars to
compensate for small
pitch errors, assure postive accuracy of setting
to 0.0002".



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MANHASSET, N. Y.

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MILWAUKEE DIE FILER with the NEW All-Purpose Deep-Throated OVERARM

Performs All Three Die-Making Operations efficiently, at 40 to 60% saving.

- Files, Saws or Lapping Stones are chucked at upper end.
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Division of Milwaukee Chaplet & Mfg. Co.
1041 S. 40th ST. MILWAUKEE 4, WIS.

MILWAUKEE DIE FILERS - PROFILE GRINDERS

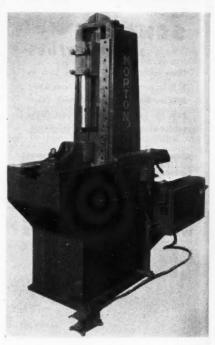
Morton Vertical Flash Trimmer

The Morton Vertical Flash Trimmer shown herewith, product of the Morton Manufacturing Co., Broadway and Hoyt, Muskegon Heights, Mich., is designed for removing the flash or upset from butt welded small motor frames and other cylindrical parts. The machine has a capacity for work from $4\frac{1}{2}$ inches minimum to 9 inches maximum diameter and with a stock thickness up to $\frac{1}{4}$ inch max-

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Morton Vertical Flash Trimmer

imum. The unit is provided with an 8-inch length of stroke and is hydraulically operated.

The base of the machine contains the hydraulic fluid and operating valves. The upper column provides machined guider bearing surfaces which form the guiding path for the vertically movable cylinder and tool carriers. The cutting cylinder is of special design, being made with generous rectangular bearing surfaces cast integral with the cylinder housing. The lower cap of the cylinder contains a special relieving clapper box type toolholder

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hy a Commander Tapper?

• Tapping capacity 0 to 3/4" with one tapper.

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• Torque control-may be adjusted to protect any size tap. This assures safe bottom-hole tapping.

· Spring clutch drive eliminates slippage and wear . . . provides smooth, quiet, positive operation.

· Compactly built-affords maximum visibility of tapping operation.

• Furnished to fit any Drill Press.

Write for circular and name of your nearest Distributor.

One COMMANDER **TAPPER** handles the range #0 to 3/4"

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Product of Commander . . . Builder of the Multi-Drill



COMPLETE RANGE AS FOLLOWS:-

6" x 18" 12" x 36" 12" x 60" 6" x 36" 12" x 48" 12" x 72"



A precision tool for testing and checking parts between centers. Both heads adjustable, locked in place by lever-operated clamps. Work is held between one fixed center while spring loaded retractable center clamps work in position. Dial indicator with adjustable holder available as extra equipment.

> FREE ADDITIONAL DATA covering complete specifications and additional features is contained in this bulletin. Write for your copy today. Ask for data sheet No. 581.

SUNDSTRAND MACHINE TOOL COMPANY

2539 Eleventh St. . Rockford, Illinois, U.S.A.

which is provided with horizontal adjustment for positioning the cutting tool in relation to the work clamping dies.

A cutting speed of 50 f.p.m. and return speed of 100 f.p.m. are provided. The work-holding and clamping fixture is hydraulically operated and may be adjusted toward or away from the back clamping dies to compensate for variation in work diameters. The operating cycle of clamp, cut, return, and unclamp is automatically controlled by a foot pedal. The cutting tools used are adjustable within the toolholder, and provisions are made for removal of tools for servicing.

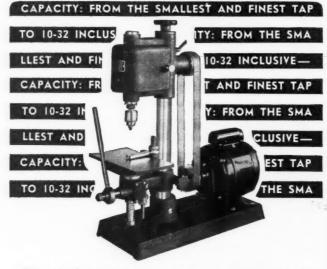
Cornelis Thread Generating Machine

An automatic thread generating machine particularly adapted for the production of machine tool lead screws, feed screws, worms, and so on, is now being introduced under the trade name of Cornelis by the George Scherr Co., Inc., 198-A Lafayette St., New York 12, N. Y. The bar or worm blank to be threaded is held on one end in a universal self-centering chuck or a special holding fixture to suit the job at hand. The work is supported in a bushing (E) directly below the cutter.

The generating cutter (C) having the helix angle of the work is driven directly by a bronze worm wheel (F) meshing with the hardened and ground master lead screw 30-degree pressure angle (G). Both master lead screw and work are free to expand in a lateral direction.

The cutter is of high speed steel. The profile is ground by a special Cornelis process, which reproduces the correct shape of the thread and retains the same pressure angle unchanged on the flanks after successive sharpening of the cutter. The cutter is sharpened on its face only.

The bed of the machine is of heavy, box type The construction. heavy saddle is fitted to the bed by scraping and is accurately guided by cylindrical guide bars. Two lead screws feed the carriage longitudinally. The control of the depth of cut is effected by means of a handwheel (J) which is



When tapping operations must be precise, and the materials used differ in characteristics as widely as paper and monel, or ceramics and bronze; then the precision and instrument industries should specify, and demand, the

HAMILTON SUPER SENSITIVE TAPPING MACHINE

Taps to the very bottom of blind holes. Reduces tap breakage to an absolute minimum. Built ruggedly . . . for fast and continuous service on tight production schedules.

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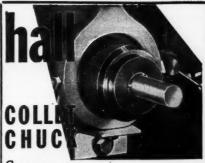
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STERLING MFG. CO.

Successors to The Benton Company
Dept. M. Coving, California



SPEED UP production in multiple operations with push-out type Hall Collet Chuck. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments...no bearings, friction, heat or loss of power. Instant release without stopping lathe.

2-inch capacity, \$145; 3-inch capacity, \$295; 1-inch capacity, \$95

Round, square or hex collets, plain—serrated HALL MANUFACTURING COMPANY 622 Tulgroso Drive • Los Angeles 26, Celif.



graduated on its rim in 1/1000 inch.

A universal thread generator with a toolslide operated by a handwheel is available for turning and cutting off cylindrical parts. Other attachments for milling keyways in long shafts can be furnished to order.

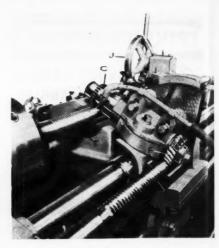
According to the manufacturer, the machine is simple to operate and requires no special skill. All data for change, gears, and so on, are provided in the operator's manual furnished with the machine, which is available in two types; namely, plain heavy duty type with special heavy saddle and outboard support of cutter spindle, and a universal type



The RIGHT TOOL for removing a broken tap is a WALTON TAP EXTRACTOR. This specialized tool has paid for itself time and time again, throughout the metal working industry, in both time saved and pieces salvaged. It will pay you to keep your crib stocked with a full set of Walton Extractors.

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THE WALTON COMPANY
HARTFORD 10, CONNECTICUT



Close-Up View of Cornelis Thread Generating Machine, Showing Operating Principle

for general production of lead screws and threads. In each type, four different lengths of bed are available (18, 37, 77, and 116 inches). Longer screws can be cut by resetting the work. The machine can also be used for generating many different formed parts.

H-P-M Hydraulic Wheel Press

To provide for ease and speed in assembling or removing wheels, pulleys, gears, and so on, The Hydrauic Press Mfg. Co., 1048 Marion Rd., Mount Gilead, Ohio, has developed a line of self-contained hydraulic wheel presses with capacities from 50 to 600 tons.

A typical size has a 48-inch clearance between bars, 128-inch maximum daylight, 24-inch ram travel, and daylight

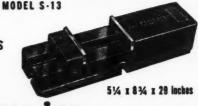
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PNEUMATIC and Hydraulic Vises

Jaw force: 90 times air-line pressure

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production devices, inc. Whitehall, New York



6 Ways Nicholson Units

CUT AIR TRAP MAINTENANCE

On Intercoolers, Aftercoolers, Separators, Receivers

Nicholson weight-operated air traps are increasingly recognized for the way they cut "down time." Below are 6 reasons why. 3 types; press. to 1500 lbs.

- 1) Leak-proof valve.
- 2) Not dependent on buoyancy of float.
- 3) Non-wire drawing.

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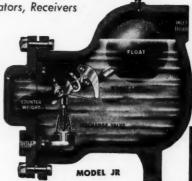
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- 4) Rugged, for unavoidable abuse.
- 5) Unaffected by dirt, pulsation.
- 6) Stainless steel where it counts.



W. H. NICHOLSON & CO., 136 Oregon St., Wilkes-Barre, Pa.

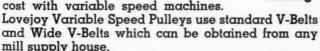


STOP HEADACHES
DUE TO FIXED
SPEED MACHINES

VARIABLE SPEED PULLEYS

No matter how efficient your fixed speed machines are, you can process materials better, faster, and at less cost with variable speed machines.

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Mfrs. of Lovejoy L-R Flexible Couplings and Dix Universal Joints

LOVEJOY FLEXIBLE COUPLING CO., • 5007 W. Lake St., Chicago 44, Ill.



adjustments of 24-inch increments. Such a press is intended for use in railroad shops and heavy machine industries.

The resistance yoke is equipped with a stop block which is used for contacting the ends of axles when mounting wheels. A throat block is provided on the end

of the ram for clearing the axle when forcing on wheels. A remote push-button operating control, mounted on a swinging arm, enables the operator to control the press ram movement at the most advantageous position.

An outstanding feature of the H-P-M Hydraulic Wheel Press is its power unit which consists of a variable delivery oil

hydraulic pump with direct electric motor drive. When high pressures are required, a booster unit doubles the normal pressure generated by the variable delivery pump. The combination of variable delivery pump and booster unit is said to assure a smooth, uniform pressure.

NEW WALL RACK FOR SHIM STOCK

Here's a new, sturdy, metal wall or bench rack which holds four cartons of rolled shim stock in gauges of your own choice. Twelve thicknesses from .001 to .012" available in brass or steel. No longer any need to buy a fixed assortment of gauges which might not be exactly the ones you want.

Each carton holds 6" by 100" of precision-gauge brass or steel. Ready for instant use without fumbling or waste. Packaged in handy dispensing cartons, it's easy to stock, easy to use, always protected. The rack will last indefinitely ... the cartons of stock are easily replaced as used.

ASK your industrial or automotive distributor today about the Laminated Shim Company line of precision, packaged stock. You'll find that he has a complete stock to meet your needs.



Holds the four gauges YOU want. Simply pull out the desired length of stock and snip it off. It's HANDY SAVES WASTEL

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We manufacture a complete line of Woodwe manufacture a compete inset wood-ruff keys in all standard sizes. These sizes range from as small as ½" x 1/16" to keys as large as 3½" x ½". All keys are care-beling shipped to you. Only the finished tested keys are permitted to leave our plants.

We carry a complete stock of high quality, dependable keys. Send for our catalog for complete information on Woodruff keys, taper pins, machine keys, and machine

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STANDARD STEEL SPECIALTY COMPANY

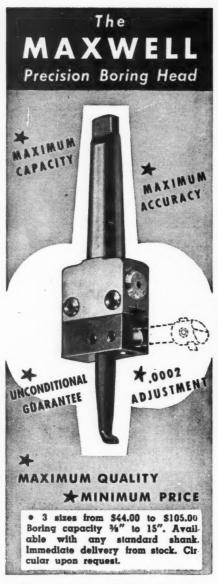
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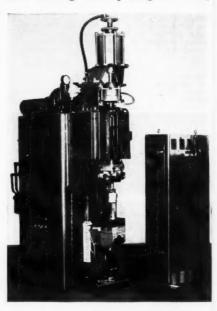


THE MAXWELL CO.

2325 BROADWAY . BEDFORD, OHIO

Thomson "Balanced Load" Converter System

The Thomson Electric Welder Co., 163 Pleasant St., Lynn, Mass., announces that its standard spot, projection, seam, and flash welders, as well as special purpose resistance welders, are now available with a "balanced load" three-phase converter system which supplies low frequency, single-phase current for resistance welding while placing an evenly



Thomson Three-Phase Projection Welder Equipped with ''Balanced Load'' Converter System

balanced moderate demand on a standard three-phase, 60-cycle, 220, 440 or 550-volt primary source. Except for a special transformer, resistance welders using the converter system are conventional in design, and existing machines may be readily adapted to use this method of power application. All additional equipment required is housed in a single, compact cabinet which also includes synchronous timing, heat and sequencing controls, as well as the power converting unit.

It is claimed that the application of low frequency secondary power to a weld in the form of a pulsating current of increasing amplitude is effective in build-

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All Kinds-Any Quantity AT THE RIGHT PRICE

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. The Hjorth Lathe has the speed, accuracy, handling ease and dependability that appeals to every operator. That's why you'll find the better shops equipping with the Hjorth Lathe.

HJORTH LATHE & TOOL CO. 8 BEACON STREET

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SAVAGE

NIBBLING MACHINE

NIBBLE YOUR COSTS

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Capacity 3/4" mild steel

FOR TUBE SLOTTING, TUBE SHAPING AND CUTTING FLAT SHEETS BY TEM-PLATE OR TO A SCRIBED LINE.

Manufactured by

W. J. SAVAGE COMPANY Knoxville Tennessee

Since 1885

Pioneer Mnfrs. of Nibbling Machines

FOR NOISELESS, HIGH SPEED RIVETING

Rotary spinning principle shapes uniform heads, silently . . . capacities up to 3/8 inches diameters. Adjustable spindle stroke, controlled pressure . . . double row radial thrust bearing supports spindle, assures long life. Table elevating screw prevents slipping. Six floor or space-saving bench models...sturdily built for troublefree operation under severe production schedules.

> FOR COMPLETE INFORMATION. WRITE FOR BULLETIN.

LINLEY BROTHERS CO., BRIDGEPORT 1. CONNECTICUT

ing up large values of heat and greatly extends the range of work which can be welded with any given machine. The accompanying illustration shows a typical Thomson three-phase projection welder together with the single cabinet which contains the power converting unit, synchronous timing and sequencing controls. The machine is 150 kva air-operated projection welder utilizing 440-volt 60-cycle three phase primary power. The special tooling is designed to facilitate the performance of a precision welding and brazing job involving non-ferrous metals.

Ransome Improved Turning Rolls

A line of improved turning rolls designed to increase welding production has been announced by the Ransome Machinery Co., Dunellen, N. J. Capable of supporting heavier loads with less handling than heretofore, the improved rolls are also said to aid in producing neater, better, and quicker welds by allowing all welds to be made in down-hand position.

According to the manufacturer, several added features enable the Ransome Improved Turning Rolls to facilitate the

welding of tanks, drums, pipes, and pressure and cylindrical vessels of all types. Of special note are the anti-friction selfaligning bearings in both the power and idler rolls of the larger sizes; a lowered drive mechanism which permits unobstructed loading from either end; and a combination steel and bronze worm wheel. The bronze worm wheel, a critical part of the drive mechanism, has been reinforced against stresses resulting from heavy loads by the addition of a steel hub and center to which the bronze rim is firmly bolt-

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In operation, the vessel to be welded is placed on the rollers and rotated around to the welder or automatic welding head at the desired weldspeed. Selfpropelled turning rolls on four-wheel carriages are also available. These rolls allow for the automatic welding of all circular as well as longi-

THE CAMPBELL THAT-CUTS-THE COST OF CUTTING

 For every cutting operation, there is one most economical method.

For many cutting operations. this is it.

It's the new CAMPBELL MODEL 223 WET ABRASIVE CUTTING MACHINE. It is the machine especially developed for faster cutting, easier operation, longer wheel life and . . .

LOWER FIRST COST



CAMPBELL MACHINE DIVISION

AMERICAN CHAIN & CABLE

931 Connecticut Avenue, Bridgeport 2, Conn.

tudinal seams, inside and outside, with the automatic welding head remaining in one fixed position, thereby eliminating all vibration at the welding head itself and ensuring the production of a good continuous weld, it is claimed. Ransome Improved Turning Rolls

Moore Improved Die Flipper

A number of improvements in its Die Flipper. designed to speed up die tryouts and assembly processes, are announced by the Moore Special Tool Co., Inc., Bridgeport, Conn. The unit is constructed to take apart and turn over a die set 20 x 40 inches with 12inch shut height, pins engaged in bushings 4 inches. In addition, one diemaker can drill, tap, and tryout, the punchholder and die shoe

always being clamped securely to the machine, it is claimed.

Among the new features of the Die Flipper is the addition of a rear lifting device. Located on the arm of the radial drill opposite the spindle, this device

BALDOR BALL BEARING GRINDERS

A Complete Line

— 6" to 12" wheels —
BENCH and PEDESTAL TYPES

Rugged---for heavy-duty service Precision-built for precision work

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BALDOR Bench Grinder No. 8100 series. Has powerful ½ h.p., ball-bearing motor, 60 cycle, 1700 rpm., 8" x 1" first-grade wheels. Heavy shaft, ¾" arbor.

\$74.00

IMMEDIATE SHIPMENT - ALL SIZES

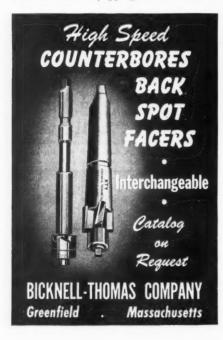
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4380 Duncan Ave., St. Louis 10, Mo.

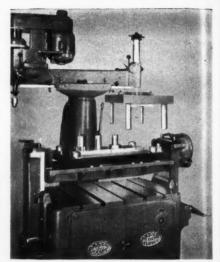
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makes possible the mechanical removal of the entire die bed or punch-holder and, if desirable, the placing of either member on a rolling truck while work is being conducted on the other. A 3-inch shank adapter is available to pull the punch-holder and die bed apart.

The Moore Improved Die Flipper also allows for counterboring for heads of screws tapped into the punch flange. A 34-inch drill chuck with long shank is available for this purpose. All of the four surfaces of a die set can be exposed toward the drill or tapping device. The ca-





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View of Moore Improved Die Flipper, Showing Rear Lifting Device Being Used in Removing an Entire Die Bed

pacity of the radial drill has been increased from 11/4 to 11/2 inches, with speeds of 200 to 1,200 revolutions per min-

Also added to the equipment available is a set of ten Lassy tap holders, is to % inch in increments of sixteenths, and three Lassy tap spindles, 4, 6, and 12 inches in size. An 18 x 36 x 36-inch portable steel table is now furnished as standard equipment for the storage of the Die Flipper's accessories. The top shelf serves as a handy work bench while the accessories themselves are housed in boxes on the second and bottom shelves of the table.

Pictured: a 24-Spindle Heavy-Duty Drill Head.

DESIGNERS AND **MANUFACTURERS** OF MULTIPLE DRILL-ING EQUIPMENT.

We invite Your Inquiry.



DRILL HEAD CO. 971 E. 8-Mile Road, Hazel Park, Mich.

DCMT Model M55A/HF Die Casting Machine

Designed to handle all standard zinc alloys as well as lead and tin-base alloys, a small high speed die casting machine identified as the Model M55A/HF is announced by the DCMT Sales Corp., 315 Bruadway, New York 7, N. Y. The machine includes a hydro-action nitra-alloy lined pot (circled in the accompanying



DCMT Model M55A/HF Die Casting Machine

illustration) which utilizes hydraulic suction to fill the cylinder. A porthole provided at the base permits all of the metal in the pot to be used before refilling becomes necessary.

The Model M55A/HF is an air-operated unit utilizing single cavity dies operating at high speed and is claimed to easily maintain a production rate of 20.000 "shots" per week. According to the manufacturer, the machine produces smooth, clean, relatively flash-free castings and eliminates practically all secondary operations, leaving only tumbling and finishing to complete the product. Additional features of the machine include optional hand and foot controls and an air system with pilot and ram valves

NUMBERALL OUTS THE COST OF STANDING NUMBERS

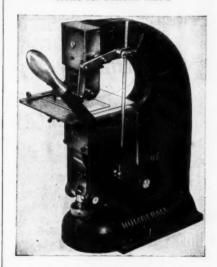
BENCH HAND TOGGLE PRESS

Model 93

For Numbering, Marking and Stamping

This press is principally made for use with our Automatic Numbering Head Model No. 50 for consecutive numbering of serial numbers on name plates, etc. Non-automatic numbering head and typeholders and steel type can also be used in this press. Press exerts a high pressure up to 10 tons. Head space adjustable.

Write for Bulletin MS93



Model No. 93

NUMBERALL STAMP & TOOL CO. HUGUENOT PARK STATEN ISLAND 12, N Y.

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integral. Toggle links consist of forged clevis hardened steel. The machine carriage is undercut for downpulls and ejecting large castings. The base plate is adjustable to allow for the use of die blocks of any required thickness.

"Temco" Series 1700 Electric Furnace

Identified as the "Temco" Series 1700. an electric furnace featuring a unique. door arrangement is announced by the Thermo Electric Mfg. Co., 488 W. Locust

St., Dubuque, Iowa. To permit access to the heating chamber with minimum loss of heat, the heavily insulated door is divided into an upper and lower section, both of which are controlled by a single counterbalanced lever. By moving the lever from the forward position to vertical, the lower section of the furnace door is lowered separately while the upper section remains snugly in place over the top half of the heating chamber. A further 60-degree movement of the lever causes the upper door section to be raised, thereby exposing the full furnace chamber. Both door sections move on parallel levers in a vertical plane, with

the hot side always away from the operator. Ease of operation of the door mechanism is said to be obtained by direct lever linkages and accurate counter-balancing. Ledges of insulation on the insides of the door sections project into the heating chamber to provide a heat seal in the closed position.

Other features of the Temco Series 1700 Electric Furnace include an all-steel body welded construction, 6 inches of dual insulation, and heating elements of high quality nickelchromium alloy. Even distribution of heat is claimed to be assured by embedding the heating elements in refractory plates which form the sides, top, and bottom of the heating chamber. This embedded construction is said to protect the elements from physical damage and maintain propspacing. Side plates are interchangeable, as are



LONGER WEAR AND BETTER PERFORMANCE

Made to exact specifications. The tang and hole ends are heat-treated for longer wear and maintenance of concentricity. They will outlast the ordinary soft sockets and perform with greater accuracy.

POPULAR SIZES

FURNISHED WITH MORSE TAPER HOLES AND SHANKS

LONG . MEDIUM . SHORT

6061 SOUTH ROCKWELL STREET, CHICAGO 8, ILLINOIS

also the top and bottom plates, and replacements can be easily made without dismantling the furnace.

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The Temco Series 1700 Furnace is sup-



"Temco" Series 1700 Electric Furnace

plied with a "Temcometer" temperature controlling and indicating instrument or with an electronic controlling pyrometer. With the Temcometer, the furnace temperature is controlled by adjustment of a knob on the instrument panel which provides for regulation of the current input anywhere between 5 and 100 per cent time "on" and permits any temperature from 350 deg. F. to maximum to be selected and automatically held. The electronic controlling pyrometer is a fully automatic precision instrument which can be preset for the desired temperature.

The furnace, which may be operated continuously up to 1,650 deg. F. and intermittently to 1,900 deg. F., is built with a chamber opening of 8½ x 7½ inches and in depths of either 13½ or 18 inches. The unit is designed for operation on 230 volts, 50/60-cycle single-phase current.

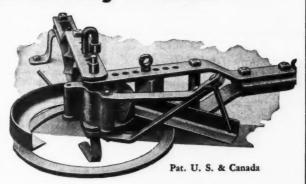
Lepel Redesigned High-Frequency Heating Unit

A completely redesigned high-frequency heating unit featuring all-steel construction of the frame, base, and panels is now being introduced by Lepel High Frequency Laboratories, Inc., 39 W. 60th St., New York, N. Y. Available in 7½, 15, and 30-kilowatt ratings, the unit includes interiors of fire-resisting materials and operating controls which are ar-

Let The Hossfeld Iron Bender Solve Your Bending Problems

Here's a universal pipe, bar and angle iron bender for the hundreds of bending jobs that must be quickly and accurately handled in maintenance and production work.

Bends pipe up to 2", and up to 4½" flat stock or 2" x 2" x 3/16" angle iron. cold. Practical and ruggedly built. No other bender like it.



Write for literature

HOSSFELD MFG. CO.

WINONA

MS-2

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ranged for maximum convenience. Additional features include improvements in the spark gap holders, which are said to minimize the need for adjustment of spark gaps, and the use of fiber glass insulation in the high-voltage side of the

main transformer.

Applicable for the high-frequency heating of ferrous and non-ferrous materials, the unit, without any auxiliary equipment, can be used for hardening, annealing, stress relieving, brazing, soldering, and melting, and may also be used with a variety of work coils for heating parts of different sizes and shapes without the



Lepel Redesigned High-Frequency Heating

need for matching transformers or contion per kilowatt.

densers. Said to deliver its full rated capacity when treating both non-ferrous and ferrous materials, the unit is designed to consume current only during the actual heating cycle and is claimed to have an unusually low water consump-

Kent No. 117 Semi-Automatic Screw Slotter

Built primarily for slotting the heads of various styles of standard or special screws but also adaptable to special light milling operations on the ends of uniform pieces similar to screws, the Kent No.

HAND SPRING WINDER

NO LATHE NECESSARY



- 1. Ideal for tool room & maintenance shop
- 2. Easily operated by hand
- 3. No lathe necessary 4. Mandrel capacity to
- 5. Wire capacity up to .229" diameter
 - 6. Pitch capacity up to
 - 7. Clamps in your bench

4 SIZES Priced from \$15 to \$35

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Machine Tool Accessories

53 PARK PLACE

N. Y. C. 7, N. Y.



MASTERCRAFT ROTARY TABLES

The Mastercraft Drill Press and Milling Table conforms to the exacting standards of best machine tool construction. A great time saver. Cuts keyways, special shapes, splines and innumerable other forms, and drills on a dead straight line or on a radius.

Write for circulars describing this model and 600, 700 and 800 Series for heavier work.

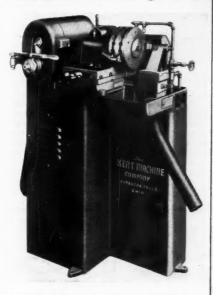
F & M SALES, INC. 1054 CAHUENGA BLVD.

HOLLYWOOD 38

CALIFORNIA

117 Semi-Automatic Screw Slotter illustrated herewith has been developed by The Kent Machine Co., Cuyahoga Falls, Ohio.

The machine is driven by a 1 h.p. 1,200 p.m. motor and is standard with a single set of work-holding discs. A double-disc assembly, as illustrated, can be furnished on order. A set of back gears between the driving spindle and saw-carrying spindle permits a variation of cutting speeds for the slotting saws. The



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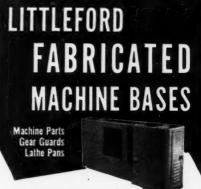
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Kent No. 117 Semi-Automatic Screw Slotter

drive to the work-holding spindle is effected through a compound train of change gears, thereby adapting the feed of the work to the material to be slotted. By this combination of speeds and feeds, the machine may be arranged for cutting either soft brass or tough steel, the output being limited only by the maximum cutting speed of the saw and the operator's skill in feeding.

The Kent No. 117 Semi-Automatic Screw Slotter has a capacity for fillister and button head screws up to %-inch body diameter and 2 inches long; flat head screws up to % inch in diameter and 2 inches long; and headless screws up to % inch in diameter and 1% inches long. The greatest depth of slot is % inch, and the standard diameter of saw is 2% inches. The machine measures 46 inches



Littleford Fabricated Machine Bases have four basic advantages

Modern Design—Welded metal fabrication lends itself to efficient, modern design, Littleford modern machines and skilled men make shaping of metals a simple task.

Less Weight and Bulk — Unwieldy and needless mass and weight are eliminated in a Littleford Fabricated Base.

Sturdy and Shock Proof — Littleford fabricated metal units have all the inherent strength, toughness to withstand shock, strain, vibration and severe service.

Adaptability — Littleford Fabricated Bases adapt themselves to changes and improvements at any time with a minimum of expense.

Littleford complete fabricating and manufacturing facilities are at your service. Send blueprints for estimates on Bases, Guards, Pans or special Machine Parts, see how Littleford fabricated products can save money.





Magnus Aja-Dip Senior Cleaning Machine

high x $31\frac{1}{2}$ inches long x 31 inches wide and has a net weight of 575 lb. and shipping weight of 775 pounds.

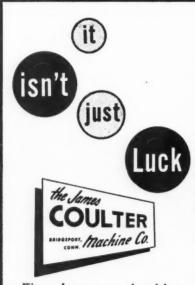
Magnus Aja-Dip Senior Cleaning Machine

Product of the Magnus Chemical Co., Inc., Equipment Division, Garwood, N. J., the Magnus Aja-Dip Senior Cleaning Machine illustrated herewith is said to be ideal for automotive shops, railroad repair shops, ship-yard repair shops, ship-yard repair shops, and metal-working plants doing a large volume of work. With the machine, the parts to be cleaned are mechanically raised and lowered in the cleaning solution 60 times per minute. This motion forces the cleaning solution through all interior recesses and passages and

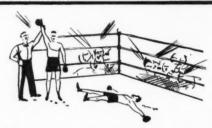
recesses and passages and a g a i n s t all surfaces, "mechanically scrubbing" off dirt, muck, grease, drawing conpounds, metal chips, and oil.

Practically any type of cleaning solution may be used in the Aja-Dip Senior, including alkaline solutions, emulsifying agents, petroleum solvents, or chlorinated solvents. Either heated or cold solutions may be used. If heated solutions are used, heating may be effected by electricity, gas, oil, steam, or kerosene.

The Magnus Aja-Dip Senior Cleaning Machine is available in eight sizes to



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Luck doesn't make a winner...
It isn't just luck that finds COULTER MACHINES successfully at work all over the world. It's the perfect combination of more than half a century of "on-the-job" experience, plus competent personnel that know threading equipment problems, and how to solve them.

COULTER has. "been-in-there" since 1896.

- ★ Thread Miller. For long and short threaded parts, internal, and external threads. Multiple and single cutter types.
- ★ Threading Lathe: For long threaded parts by the chaser method.

meet individual cleaning requirements. Capacities range from 75 to 2,200 lb. of parts at a time.

Morey Process of Precision Hard Chrome Plating

A process of precision hard chrome plating to size, designated as the Morey, is announced by the Chrome Electro-Forming Co., 7515 Lyndon Ave., Detroit 21, Mich. Advantages which are said to

he provided by the process include close control of plating thickness; excellent throwing power which allows for the plating of grooves, shoulders, and so on, with the maintenance of sharp, clean corners; the production of a highly adherent and ductile plate of minimum porosity; and high quality product finish.

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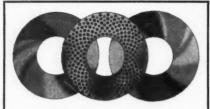
The Morey Process can be used for the precision chrome plating of all types of production parts such as pistons, cams, rods, gears, valves, bearings, cylinders, valve bodies, and so on, as well as gages, taps, reamers, chasers, broaches, burnishing tools, countersinks, burring tools, draw dies, forging dies, molds, die casting dies, and various other products.

Elge Portable Welding Head

A portable welding head for arc welding which is designed to produce continuous welds using standard coated electrodes is announced by Elge Associates, Mukwonago, Wis. The unit is said to be capable of welding sheet and plate and joining right-angle or oblique sections. Longitudinal welds on curved surfaces such as pipes and tanks can also be easily made.

The Elge Portable Welding Head is equipped with all necessary controls and adjustments for the fine adjustment of welding current and regulation of arc length, as well as vertical and horizontal adjustments. Carriage speed adjustments





FLAT RACE BALL THRUST BEARINGS WITH BRONZE RETAINERS

These bearings range from 1/2" to 31/2" shaft diameter; from 1-7/32" to 5-7/32" outside diameter. Larger sizes can be made to 25" outside diameter.

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Standard units available.

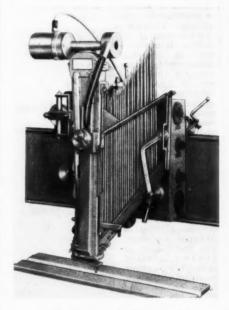
Write today for descriptive circular.

ALOFS MFG. CO.

1622 Madison, Grand Rapids, Mich.

between 1 and 40 inches per minute can between I and 40 inches per limited can be quickly made. Track fabricated of tubing is used to guide the carriage. Straight track is furnished with the welding head; however, curved or circumferential track can be easily fabricated. Electrode magazines may be refilled during the operating period, thus permitting the production of long unbroken welds.

Ruggedly built of aluminum, steel, and heat-resistant alloys, the Elge Portable

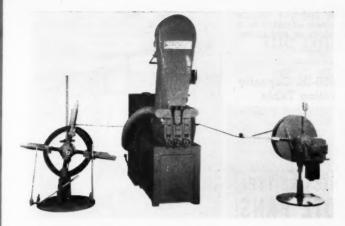


Elge Portable Welding Head

Welding Head is said to be light enough to permit moving and setting up by one person.

Curtis "Straight-O-Matic" Model 600 Abrasive Belt Polisher and Grinder

Designated as the "Straight-O-Matic" Model 600, an abrasive belt polisher and grinder for the automatic finishing of flat stock, such as carpenter hand saw blades, machetes, and strip steel up to 10 inches wide, has been placed on the market by the Curtis Machine Corp., 1300 E. Second



Curtis "Straight - O - Matic" Model 600
Abrasive Belt Polisher and Grinder Set
Up for Use in Connection with Coil Unwinding and Winding Machines

to be readily applicable in the finishing trade where flat stock is to be polished, or where work is finished prior to fabricating, the machine can be used not only in tandem but also in connection with automatic buffing heads so that a complete

operation can be performed if desired. The machine features a straight-through arrangement for high speed production, and is designed to allow for manual feeding with coil unwinding and winding machines or by a conveyor or equivalent means. The machine is provided with an infinitely variable and quickly adjustable

St., Jamestown, N. Y. The machine can be used as an individual unit, changing belts for the various grits to be used, or it can be used in tandem.

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If desired, the Straight-O-Matic Model 600 can be supplied with an inverted head so that both the top and bottom of stock may be finished with one pass. Said to

WHITNEY- JENSEN PRODUCTS

No. 20 Ball Bearing Punch

Capacity—Mild steel,
1/2" thru 1/2"





No. 5 Jr. Metal Hand Punch

Furnished with 7 punches and dies in metal or paper box.

Capacity— 1/4" thru 16 Ga. mild steel. Weight—23/4 lbs.

Write for Catalog 16-49

WHITNEY METAL TOOL COMPANY

feed of from 20 to 60 feet per minute and is equipped with screw adjusted feed rolls to accommodate stock of any thickness up to 1 inch.

Lyon-Raymond 4,000-lb. Capacity Hydraulic Elevating Table

The Lyon-Raymond Corp., 6784 Madison St., Greene, N. Y., announces the addition to its line of hydraulic elevating tables of a standard 4,000-lb. capacity model. The table has a 30 x 30-inch top



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Machine Operation Times



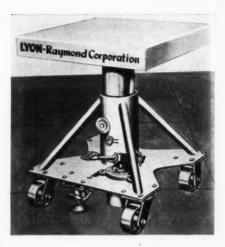
for ESTIMATORS by Joseph C. Derse

READY-MADE DATA tables, practical methods for building up quick, reliable, consistent estimates of machine operation times without need

for taking special time studies! Gives times for each operation on principal metal-working machines. Shows you how to use data; analyze drawings to determine most economical operations; list steps in each machine cycle; diagram tool set-ups; select proper feeds, speeds; make allowances in final estimates. 82 illustrations. \$6.00

M 460

THE RONALD PRESS COMPANY 15 East 26th St., New York 10



Lyon-Raymond 4000-lb. Capacity Hydraulic Elevating Table

which revolves fully or can be locked in a fixed position. The top has a 14-inch range of elevation, the lowered height being 28 inches and the elevated height 42 inches. Two heavy duty ball bearing swivel casters and two heavy duty rigid casters with 6-inch wheels and roller bearings provide portability under full load. A floor lock type brake holds the table in position when required.

A single-speed hydraulic foot pump developing 1,000 p.s.i. is said to provide for easy and smooth operation of the table. A pedal release valve controls the lowering speed and holds the top securely at any intermediate position between the lowered and elevated heights. The table is claimed to be especially suited for die handling. Being portable, it can be used to transfer dies between storage racks



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and presses. The elevating feature allows each die to be transferred at press bed or storage rack level, thus reducing the possibility of accidents to workers.

The range of elevation of the unit allows work to be positioned at a convenient working height for welding, grinding, die repairing, and other bench jobs. Heavy overhanging work can be supported evenly because of the adjustable height. The unit can also serve as a modified sheet feeding table for handling heavy sheets.

Eutectrode 24/49 Welding Electrode

Featuring the 1949 Formula "Frigidare" flux coating, an electrode specially designed to produce strong bonds and high tensile welds that are completely machinable through the weld zone on both gray and alloy cast iron without preheating has been announced by the Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y. Designated as the Eutectrode 24/49, the electrode can be quickly and easily applied on a.c. or d.c. with either straight or reverse polarity. The burn-off rate is said to be uniform and the flow rapid. Moreover, the arc area is claimed to be clearly visible at all times with this non-fuming rod.

The Eutectrode 24/49 is particularly recommended for the metal arc welding of gray and alloy cast iron where preheating is impossible or undesirable. Its excellent color match and complete machinability are said to make the electrode ideal for cast iron repairs that must be finish machined. The electrode can also be used for making minor repairs on malleable cast iron, cast steel, and nickel alloys, as well as for the joining of any of these metals.

The Eutectrode 24/49 Electrode is available in $\frac{1}{12}$, $\frac{1}{12}$, and $\frac{1}{12}$ -inch diameters, each size being marked with a white tip for identification. Other sizes can be obtained on special order.

Sasgen Portable Shop Crane

A portable shop crane is now being offered in three models under the trade name of Sasgen by the Grand Specialties Co., 3135 W. Grand Ave., Chicago 22, Ill. The No. 1-C has a maximum lift of 7 feet and weighs 350 lb. The No. 2-C has a maximum lift of 8 feet 6 inches and weighs 365 lb. The No. 7-C has a maximum

When you need the <u>right</u> <u>gear</u> in a <u>burry</u>



It's one thing to get a gear cut exactly to your specifications . . . and another to get it on time. To be sure of satisfaction both ways, there's only one safe thing to do: specify Grant gears. For, whether you order by 'phone, telegraph or letter, Grant will have just the gear you want on its way in a matter of hours.

Next time a gear breakdown threatens a costly production tie-up, remember Grant's "in-the-pinch" service. Send today for free catalog of "In Stock" gears.

Reduction Units?
Grant has all types.
Write for catalog.

GRANT GEAR WORKS, INC. 162 W. SECOND STREET SO. BOSTON MASS.





(Left) Sasgen No. 7-C Portable Shop Crane, (Right) Sasgen No. 2-C Portable Shop Crane

and moving heavy items in and around the shop yard. The safety winch crank of the unit is turned in a clockwise direction to lift the load. Seven turns of the crank provide for lifting of the load approximately one foot. Whenever the operator stops turning the crank, the load is said to

t HreHister

be held firmly and safely in position by the winch, which is claimed to be of sufficient strength to accommodate the maximum load on a single cable line with

one operator at the crank.

On the No. 7-C the boom can be extended to 79 inches. When folded down. the boom is 48 inches from the ground,

mum lift of 10 feet 8 inches and weighs 480 pounds.

Easy to roll where desired, the Sasgen Portable Shop Crane is said to be ideal for handling motors, engines, castings, and so on, in and out of lathes and other machine tools; dies in and out of punch presses; loading and unloading trucks;

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Single or multiple diameter pieces. High in quality-accurate to blueprint-prompt service. In position to handle large or small lots.

GRINDING

Inquiry invited.

COMMERCIAL GRINDING 6605 Cedar Ave., Phone: EN 3412, CLEVELAND 3, 0



thus enabling the crane to be moved through a 6-foot high x 32-inch wide doorway or opening on its roller rubbertired wheels. The boom and winch weigh 185 lb. and may be moved from the wheel carriage by removing one belt. The No. 7-C can be supplied for hydraulic operation, with extra reach and lift capacities.

"Krylon" Plastic Spray

Designed to seal out air, water, chemicals, oil, grease and acids, a clear protective coating to be known as "Krylon"

Plastic Spray is now being marketed by the Foster & Kester Co., Reading North Broad Street Station Bldg., Philadelphia 32, Pa. Described as flexible, quick drying, and durable, the coating is claimed to eliminate the rust and corrosion of many products, as well as the deterioration of many tools used in the metalworking industry.

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According to the manufacturer, newly machined parts sprayed with Krylon immediately after the machining operation remain the same through an indefinite storage period. Moreover. fine instruments and tools often ruined by rust and corrosion are claimed to be safely protected with Krylon when in the toolroom storage bin or in the shop. The protective coating may be removed at any time by a special solvent, available from the manufacturer.

Cleveland Tramrail Automatic Chip-Handling Carrier

An automatic overhead carrier for transporting baskets of various metal chips from an oil extractor to any one of a number of storage bunkers has been developed by the Cleveland Tramrail Division, The Cleveland Crane & Engineering Co., Wickliffe, Ohio. The carrier is designed to deliver the basket, turn it over for emptying, and return it automatically without the operator accompanying. All operations are handled by one man at the extractor.

Baskets of approximately 15-cubic foot

AUTOMATIC CONTROL At No Extra Cost!

HUPPERT

Model 22 De Luxe

FURNACE

Everything's in one compact unit — with no extras to buy . . . That's the Huppert Model 22 De Luxe Furnace. Particularly suited to laboratory work or small unit production, this unit has the added advantage of the built-in Huppert Automatic Temperature Control. Automatically maintained at any temperature you set—from 325°

to 1800° F. Multi-insulated walls effectively cut heat loss, result in low operating cost. Two removable porcelain trays. Special alloy elements with totally enclosed contacts. All steel construction. Current consumption 1600 watts. 110 v AC. O.D. 12"x14"x19".



PRICE (complete with pyrometer and control)

All Stainless Steel \$120

Standard Model 22, manually controlled, is also available.

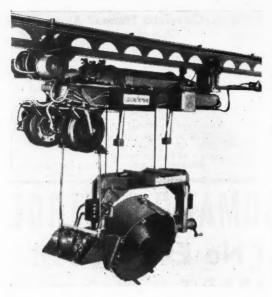
Write for literature on the Huppert Furnaces and Ovens —a complete line including floor models.

K. H. HUPPERT CO.

6841 Cottage Grove Ave.

Chicago 37, III.





is in the high position. Such an arrangement necessitates the operator keeping the "hoist" button depressed until the upper position has been reached. whereupon the carrier is set in motion automatically. The travel speed of the carrier is 200 feet per minute.

Texas H Grease O

A soft consistency grease for winter use in heavy duty industrial service has been developed by The Texas Co., 135 E. 42nd St., New York 17, N. Y. Known as H Grease O, the material has a lime soap base, is gold in color, and is said to be particularly suitable for lowtemperature applications.

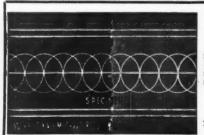
capacity, designed to accommodate 1,000lb. loads of chips, can be handled with the carrier. The baskets are clamped into position by a hand crank and turn over automatically at a speed of 121/2 r.p.m. at the destination. A dial selector, located just above the crank, permits the preselection of any station to which it is desired to dispatch a load. This particular selector is said to serve systems having up to 400 stations.

The unit has three motors, one each for the hoist, the carrier travel, and the basket roll-over. Two cable take-up reels are provided, one for power to the rollover motor and the other for control circuits. The carrier is arranged so that it will not travel unless the basket grab

Niagara 16-Gauge Capacity Foot Squaring Shear

The Niagara Machine and Tool Works. 637 Northland Ave., Buffalo 11, N. Y., announces a 16-gauge capacity foot squaring shear which is specially engineered to combine maximum strength and rigidity with lightness in weight, easy action, and distinctive styling. To accomplish this, the machine is fabricated completely from steel.

The bed, which is a rigid one-piece weldment, and the deep crosshead, which is guided in flat long-wearing bronze ways, provide a solid non-deflecting support to the knives to assure accurate,



DYKEM STEEL BLUE

Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The elark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY

2301F NORTH 11th ST.

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(In Canada: 2466 Dundas St., West, Toronto, Ont.)

clean, square cuts. The easy, well balanced action of the shear is said to be due in large part to the unusually long crosshead counterbalance springs concealed behind the panel housings. The hold-down (available on 36-inch and longer shear models) is designed to provide for clear visibility of the cutting line. A large torsion-resisting cross shaft is said to assure equal motion on each end of the crosshead regardless of where

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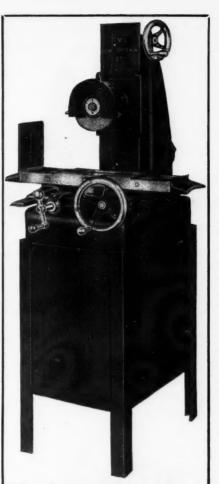
Niagara 16-Gauge Capacity Foot Squaring Shear

the operator applies pressure to the full length non-slip treadle.

The Niagara 16-Gauge Capacity Foot Squaring Shear is available in 30, 36, 42, and 52-inch widths.

Cooke Works Measuring Microscope

For use in the workshop, tool and inspection rooms, and laboratory for the examination of opaque and translucent specimens and profile forms, The R. Y. Ferner Co., 110 Pleasant St., Boston 48, Mass., is distributing the Cooke Works Measuring Microscope illustrated herewith. A feature of the instrument is the lighting system incorporated within the

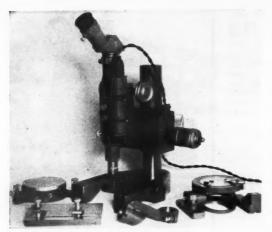


TML Hand Feed Precision Surface Grinder

For the precise jobs. Bench and floor types. Quick and easy to operate. Grinds 12 in. long x 6 in. wide x 9 in. over platen. 7 in. dia. x ½ in. face x 1¼ in. hole wheel. Motor ½ or ¾ H.P. Repeated purchases indorse it.

THORNTON MECHANICAL LABORATORY

New Britain, Conn.



body tube of the microscope for the illumination of opaque objects, Brinell impressions, and for surface examination. The fact that the light reaches the object from a direction coaxial with the line of sight eliminates shadow effects likely to interfere with accurate measurement.

The stand consists of a horseshoe base plate with three flat surfaces and two V-surfaces on the underside so that the microscope can be used either on a table, surface plate, or cylindrical surface. The upper side of the base plate has three studs which accommodate the interchangeable stages. The pillar which carries the micrometer traversing mechanism and microscope is telescopic and is provided with the necessary clamp. The microscope is mounted on a ball bearing slide which allows for free and constant movement that is controlled by a micrometer screw having a range of 1 inch.

The microscope body tube can be fitted with an inclined eyepiece attachment which is reversible so that when using daylight illumination, the work side of the microscope may be away from the observer. The vertical illuminator of the instrument consists of a glass plate re-





1.-1800 light cuts per hour. 2.—Either horizontal or vertical position.
3.—Collets changed instantly.

4.—Automatically knocks piece out.

Model D—Ratchet indexing only—1" cap.

Model E—Both degree and ratchet indexing

Capacity up to l' Model F—Both degree and ratchet indexing
—Capacity up to 24". Write for Folders

J. W. DEARBORN Ansonia, Conn.



flector together with a built-in light source. Oblique illumination may be obtained by transferring the lamp fitting to the bracket at the base of the micro-

scope body.

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Standard equipment of a Cooke Works Measuring Microscope includes a steel 4 x 3-inch steel stage provided with two spring clips mounted in a machined groove. If desired, a circular measuring stage can be mounted on the plain stage. The circular stage is graduated to degrees and, in addition to the measuring of angles, is said to be a convenience in setting parallel to the measuring slide of

the work to be measured. The stage for transmitted light is of circular design, fitted with a glass disc capable of rotation. Spring clips are provided for clamping the speci-

men.

Pallet Rack

A portable rack for stacking palletized materials is now being offered standard and heavy duty models by the Equipment Manufacturing Co., Inc., 21550 Hoover Rd., Detroit 5, Mich. The rack is designed to accelerate orderpicking and case handling by permitting the tiering of pallet loads to ceiling heights without tieing up low-level goods. Order - picking lines are thereby shortened and a wide variety of reserve stocks can be stored in any one bay.

The rack can be readily installed by merely spotting in place with a fork truck. No welding or cutting is necessary. For varying pallet load heights,

adjusable rack underclearances are obtainable. Rack levels can be raised to accommodate high loads by the use of removable extension posts.

Palmer-Shile Improved Drum and Barrel Tilt

Enclosed safety type locking devices feature the improved drum and barrel tilt now being manufactured by the Palmer-Shile Co., 16022 Fullerton Ave., De-

NEW "CB" Series PERECO

fully equipped single-unit Electric Laboratory and Shop Furnaces

2500° F. for normal use (up to 3000° F. occasional "flash" heat-ups)

Here's the newest in Pereco Electric Furnaces (CB-55) for multiple heating tasks requiring close control of extremely flexible heat cycle. Ready to use after simple hook-up. Size 32" deep, 321/2" wide, 64" high. (Also in larger sizes.) Chamber 12" d. x 83/4" w. x 6" h. Uniform heat from 6 Globar elements. All controls on front panel; automatic temperature controller; current input meter; 36-tap autotransformer with switch interlock; circuit breaker cut-off switch; and safety pilot-light. Wedge-fit counter-balanced door. 230-v., 60-cyc., 1-ph. A. C., with variable control from 3.5 to max. 11 KW. Write today. Connections for introduction of atmospheres can be supplied as optional equipment.



PERECO also makes standard and special electric furnaces for any temperature 450° to 2700° F.



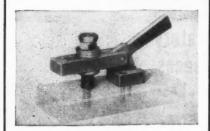
PERENY EQUIPMENT CO.

Dept. P, 893 Chambers Rd., Columbus 12, Ohio

troit 27, Mich. Gear units are now housed in a steel case, operating in a bath of oil, to keep out dust, dirt, and metal chips that might interfere with efficient performance.

Designed to completely eliminate hand dumping, the tilt is turned by a worm drive, hand chain operated, and can be rotated to 360 degrees. The unit has a 1,000-lb capacity and is designed for a standard 55-gal. drum or barrel. Special sizes can be manufactured to user requirements. Constructed entirely of heavy structural steel, the unit is welded throughout and weighs approximately

M -T FIXTURE CLAMPS and COMPONENTS



There is a M-T Fixture Clamp and Fixture Component to meet your most exacting requirements. Immediate delivery.

Write for catalog and price list.

MORTON MACHINE WORKS

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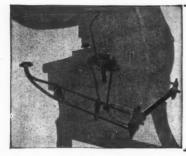
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Palmer-Shile Improved Drum and Barrel Tilt

125 lb. The hand chain is 6 feet long from the top of the wheel to the bottom of the chain.

Heald Feed Control Box

According to an announcement made by The Heald Machine Co., Worcester 6, Mass., the "brain center" of all cycling operations on the new Heald internal grinding machines is the universal type feed control box shown in the accompanying illustration. Conveniently located on each machine, whether arranged for Size-Matic or Gage-Matic sizing, the control box includes two orderly business-



SAFETY EQUIPMENT FOR POWER AND FOOT PRESSES

Combination Gate and Barrier Guards
Two-Hand Safety Starting Devices
Sweep Guards . . . Single-Stroke Attachments
Stock Reels . . . Fly Wheel Guards, etc.

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JOHN HUMM SAFETY EQUIPMENT CO.
251 SHEFFIELD AVE. BROOKLYN, N. Y.

Heald Internal Grinder Equipped with New Feed Control Box

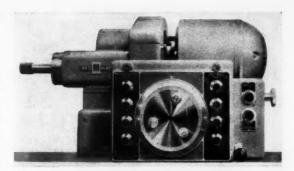
like panels combined with a unique dial ring arrangement that are said to provide for ease and economy of setup. Once set, the controls may be left throughout the day without the necessity of continual change; control locks are provided for optional use.

Outstanding advantages claimed for the Heald Feed Control Box are that it re-

duces set-up time to a minimum, provides a centrally located unit for regulating machine cycle operations, and assures positive control of all grinding elements quickly, easily, and economically.

Lithium Atmosphere Forge Furnace

The Lithium Co., 111 Sylvan Ave., Newark 4, N. J., has developed a direct-fired atmosphere forge furnace in which forg-



ings are said to be heated free of scale. A suitable carrier gas from a gas generator is passed through a vaporizer tube where it mixes with vaporized lithium coming from the lithium vaporizing chamber. The gas mixture is then introduced into the work chamber where it provides the necessary protective atmosphere at the work. In addition, the slight coating of lithium which is imparted to the metal surface is said to ensure against scaling while the metal is being removed from the furnace to the press,

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With it you can cut keyways by hand in one minute in gears, cutters, couplings, collars, pulley hubs, etc.

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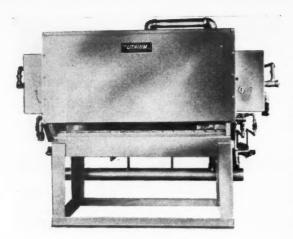
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Please mail me the Minute Man Manual "S" containing complete description and prices of Keyway Broach Kits and valuable reference information.

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Lithium Atmosphere Forge Furnace the

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for heavy constant duty and is available in standard single and double-slot and continuous types. The single-slot types range from 12-inch slot width and 8-inch hearth depth to 64-inch hearth depth. For double capacity, the double-slot types are provided.

If desired, the lithium atmosphere generating unit and vaporizer can be adapted to conventional forge furnaces or any other direct-fired batch or continuous heating furnaces operating at 1,400 to 2,300 deg. F. to provide the desired pro-

tective atmosphere.

upsetter, or hammer during hot working and during cooling.

The Lithium Atmosphere Forge Furnace is constructed of a heavy steel shell provided with a thick wall of high quality refractory and insulating material. Direct fired, utilizing oil or gas or oil and gas in combination, the furnace is built

Brown & Sharpe Nos. 2L and 2LB Surface Grinding Machines

Particularly adapted to unusually dusty or severe operating conditions, two surface grinding machines designated as

Anderson

Speed up scraping operations with these efficient blades. They are especially good for hard alloy iron and the extremely hard bronze castings. If you are already using Anderson Hand Scrapers it is not necessary to buy complete new scrapers in order to use carboloy tipped blades. Simply remove the high-speed steel blade and slip in the Anderson Carboloy Tipped Blade. They are available in three widths.





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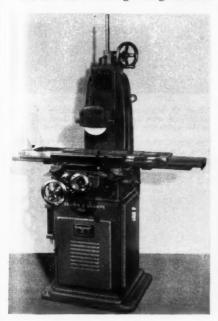
ANDERSON BROS. MFG. CO., Rockford, III. See Our Catalog in Sweet's

Hand and Power Hydraulic Presses, Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters.

February, 1949

the Nos. 2L and 2LB have been announced by the Brown & Sharpe Mfg. Co., Providence 1, R. I. With the capacities and the convenient operating features of the companion Nos. 2 and 2B surface grinding machines, the Nos. 2L and 2LB are provided with fully automatic lubrication of all moving parts and surfaces, and the table sliding surfaces are completely protected from abrasive dust.

The No. 2L surface grinding machine



Brown & Sharpe No. 2L Surface Grinding
Machine

has automatic feeds, while the No. 2LB has hand feeds only. Each machine is offered with a drive from a motor in the base or with a motorized spindle.

Semi-Automatic Gaging Device for Michigan Automatic Gear Finishing Machine Loader

The addition of a semi-automatic gaging device to its automatic loader for gear finishing machines has been announced by The Michigan Tool Co., 7171



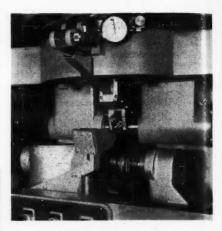


E. McNichols Road, Detroit 12, Mich. The device which is designed for mounting at the "loading" end of the chute leading into the machine, as shown in the accompanying illustration, consists of two gears which are used to gage the pinions being finished and mounted so that they can revolve freely. The center distance between the two gaging gears is such that a pinion with an oversize pitch diameter, or one on which the stock is excessive for best shaving results, will not drop through between the gears into the chute.

After dropping into the chute, the pin-







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View of Michigan Gear Finishing Machine Equipped with Semi-Automatic Gaging Device in Combination with Automatic Gear Loader

ions are picked up one at a time by automatic adapters (which act as arbors), shaved, and ejected into the exit chute—all automatically. The illustration shows a pinion in shaving position, the guard having been removed from the Michigan Series 870 Universal Underpass Shaver to show the entire mechanism.

"Silbrax" Internally Fluxed Gas Welding Rod

Known as "Silbrax," an internally fluxed gas welding rod for welding deoxidized copper is now being offered by the Arcos Corp., 1500 S. 50th St., Philadelphia 43, Pa. The self-fluxing property of the rod is claimed to prevent repeated rod oxidation and therefore faulty weld



Feb

metal. Since the rod is fluxed internally, the heat is applied first to the metal and then transmitted to the flux. In this manner, the rod is said to maintain a proper balance at all times between melting metal and flux.

Silbrax can also be used as a filler rod for carbon and inert arc welding.

Thor "99" Valve Refacer

The Independent Pneumatic Tool Co., 175 State St., Aurora, Ill., announces the Thor "99" Valve Refacer illustrated herewith. Designed for wet grinding, the unit is equipped with a double-grip collet and speed chuck for fast, precision valve refacing at all standard angles. The double-grip collet is hardened, ground, and internally lapped and is gear driven by its own individual motor. According to the manufacturer, the speed chuck is constructed to permit even large butt-end valves to be admitted and released with

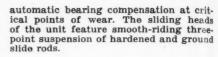


Thor "99" Valve Refacer

only one turn of the 2¼-inch handwheel. The Thor 99 Valve Refacer is of extra heavy construction and is provided with







"Microtrip" Safety Device

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Micro Switch, Freeport, Ill., announces a two-hand easy-to-operate electrical device for the safe control of tripping



Press Equipped with "Microtrip" Safety Device

mechanisms on punch presses, riveting machines, shears, spot welders, and air presses. The device consists of a control box, two precision switches, and the necessary tripping mechanism, and can be quickly and easily installed on present equipment.

According to the manufacturer, the Microtrip makes certain that both hands of the operator are out of the hazard area while the press ram is in motion. The device requires that both hands touch the switch buttons in order to operate the tripping mechanism. If both switches are not actuated at the same time, the electrical circuit controlling the tripping



1096 North River Road . St. Clair, Michigan

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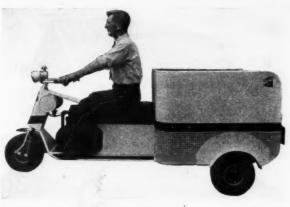
mechanism becomes inoperative, Any attempt to tie down either of the switches or the reset button on the control box is said to have the same effect.

Brogan Errand Boy

For use in manufacturing plants, factories, and other areas, the B. & B. Specialty Co., Blue Ash

Ave. and Alpine Place, Rossmoyne, Ohio, has developed a three-wheel motor scooter known as the Brogan Errand Boy. The unit has a 250-lb. capacity and a material compartment that measures approximately 15 cubic feet.

Easy to drive, the Brogan Errand Boy, according to the manufacturer, can be turned in its own length (8 feet, 3 inches) and averages approximately 75 miles to a gallon of gasoline. The engine is a one-



cylinder 4½ h.p. type which provides for a maximum scooter speed of 30 to 35 miles per hour.

Chicago Power Leaf-Type Brake with Air Clamping Arrangement

The Dreis & Krump Mfg. Co., 7418 Loomis Blvd., Chicago 36, Ill., announces that its Chicago Power Leaf-Type Brake



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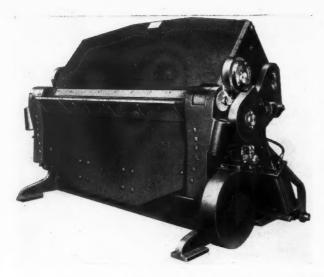


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Chicago Power Leaf-Type Brake with Air Clamping Arrangement

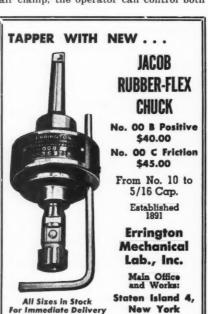
ends of the machine simultaneously, or the operator and helper can clamp each end in dependent ly. Clamping is said to be effected with maximum accuracy and speed with a minimum of effort.

According to the manufacturer, the air clamping arrangement permits a wider variety of work to be performed on the Chicago Power Leaf-Type Brake with greater speed and ease than heretofore.

is now available equipped with an air clamping arrangement which replaces the original geared-type clamp. With the air clamp, the operator can control both

Hammond Model 3-A Backstand

Product of Hammond Machinery Builders, Inc., Dept. GP-21, Kalamazoo 54F. Mich., the Hammond Model 3-A Air





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Backstand illustrated herewith is designed for heavy production grinding or polishing with abrasive belts. The unit has an air actuated cylinder which automatically maintains correct belt tension, compensating immediately for a fraction of an inch of belt stretch. Different pieces of material require different belt tension. After the correct tension is de-

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Hammond Model 3-A Backstand

termined, the operator merely sets a pressure regulator valve.

The Model 3-A is of heavy cast-iron construction except for the stainless steel 12-inch diameter x 7-inch face idler pulley, which is diametrically balanced and operates on high quality sealed ball bearings.

Kraus Special Hoppers

Special hoppers for the automatic feeding of a variety of parts are now being produced by Kraus Design, Inc., 41 S. Water St., Rochester 4, N. Y. The accompanying illustration shows a dual

ALMOND DRILL CHUCKS



Maximum Gripping Power with
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Long Life.
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T. R. Almond Mfg. Co. Ashburnham, Mass. U. S. A.

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Headless Set Screws Secket Set Scrows





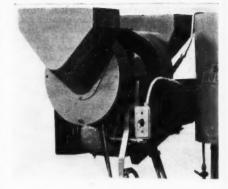
Try Them On Your Next Job!

ECONOMY MACHINE PRODUCTS COMPANY

5212 Lawrence Ave., Chicago 30, III.

hopper setup for feeding parts to machining equipment. These hoppers represent only one of many types which can be designed to suit specific workpieces, all of which will feed steady streams of parts into chutes.

The hoppers illustrated each include a vertical gated disc, arranged to allow for the passage of the workpiece to the chute when presented in the required position. Operating on a percentage basis, the discharge rate of such hoppers is largely a function of how many pieces, in normal tumbling action, will reach the gates in the desired position. According



Kraus Special Dual Hopper Setup

Kraus Special Dual Hopper Setup

to the manufacturer, the hoppers will not jam whether or not pieces are being withdrawn from the chute, and the delivery rate may be varied through a considerable range by controlling the speed of rotation of the discs.

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SAFETY GUARD

With Automatic Counter

Counter Won't Register Unless Guard Is In Place

Guard sweeps across feed area on downward stroke of ram. Flat are of guard arm travel provides greatest possible protection. Entire guard easi lly swung aside

ily swung aside while press adjustments are made.

Today is the Day to Prevent Accidents
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FITS ANY PRESS . 30 DAYS' TRIAL

Salesmen: A few territories still open.
Write for details.

SEARJEANT METAL PRODUCTS, INC. 89-91 Allen Street Rochester 6, N. Y.

Reed-Prentice Automatic Pneumatic Screw Driver

An automatic pneumatic screw driver which is designed to feed screws, one at a time, from a hopper to the driving tool has been developed by the Reed-Prentice Corp., Dept. 28, 677 Cambridge St., Worcester 4, Mass. A single movement of the trigger by the operator provides for automatic gripping of the screw in the driver after it is pneumatically delivered through a tube from the hopper, while a second movement of the trigger provides air pressure to the screw driver motor for threading the screw into the desired position. An air pressure of 90 lb. is said

NO BUSHINGS, GUIDES or PILOTS NEEDED!

THE READING BROACH KEYSEATER

The Reading Bench Machine requires no bushings, guides or pilots. No other machine like it. Very fast—capacity from 1/8 to 1/8 cutter.

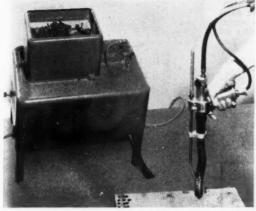
Low first cost-prompt delivery.

READING MACHINE COMPANY, Reading (Cincinnati), Ohio



294





to be sufficient for both the feed mechanism and the operation of the driver, and is claimed to provide for the feeding of screws to the driver from the hopper located a maximum of 50 feet away.

The model shown herewith is designed to handle slotted or recessed head screws from No. 4 to No. 10 up to 1¼ inches in length. Other models can be provided to handle any size or type of wood, metal self-tapping, or machine screws.

"Isopac" Isolating Paste

A material that is claimed to be both effective and economical for keeping part of a workpiece soft while the rest is carburized has been developed by Denfis Chemical Laboratories, Inc., 172 Pacific St., Brooklyn 2, N. Y. Known as "Isopac," the paste is applied to the sec-

tions to be kept soft and is left in place while the work is case-hardened.

According to the manufacturer, Isopac prevents the penetration of carbon gas and insulates the protected section to prevent rapid cooling. The paste is said to neither crack nor shrink and can be easily removed after the work is quench-

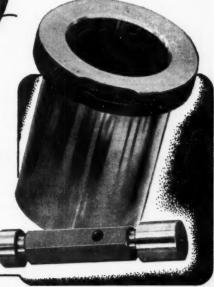
Economy DRILL JIG Bushings – Gages

ALL A. S. A. STANDARD types and sizes, in stock—ready for immediate delivery. Also excellent delivery on NEW GAGES and Gages salvaged by HARD CHROMIUM PLATING.

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ECONOMY TOOL & MACHINE CO.

1827 S. 68th St., Milwaukee 14, Wis.



ed. Isopac may be used on work which is carburized with the aid of a box furnace, atmosphere, or salt bath.

Hutchinson Vertical Milling Attachment

R. Hutchinson & Co., 163 Albany St., New Brunswick, N. J., announces an attachment for adapting horizontal bench millers to vertical milling operations. According to the manufacturer, the attachment is designed to quickly convert Atlas



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Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

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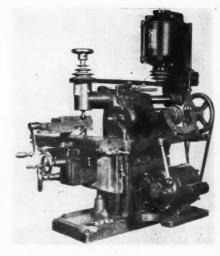


Illustration Showing Hutchinson Vertical Milling Attachment Installed on a Horizontal Bench Miller

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Series M1, MF, and MH milling machines or any bench miller with a 1½-inch diameter overarm to vertical operation in a matter of minutes.

Rockwell Variable Speed Hydraulic Drive System

A variable speed hydraulic drive system utilizing pumps and motors of the Roto-cycle design as the hydraulically coupled activating mediums is now being produced by the Hydraulics Division, Rockwell Manufacturing Co., 50 Water St., Pittsburgh 22, Pa. The motors may be remotely located from the pumps, and

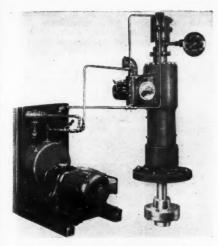
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Rockwell Variable Speed Hydraulic Drive
System

the hydraulic circuit can be arranged so that several motors are supplied with fluid pressure from one central pumping source. A "Hydro-syn" governing system is used to maintain a constant predetermined speed. The desired speed is first set by adjusting the position of a main circuit control valve on a graduated dial. This speed is then maintained through the functioning of a separate hydraulic control circuit that operates on the constant pressure differential principle through a pilot valve. Should this constant pressure differential be upset for any reason, the pilot valve instantly reacts to reposition the proportioning of fluid to the hydraulic motor. The Hydrosyn system can be used to maintain any predetermined condition of speed, torque, pressure, volume, or liquid level.

The Rockwell Variable Speed Hydraulic Drive System can be furnished in speed ranges up to 5,000 r.p.m. and in ratings from fractional to 125 h.p. or greater.

Eisler Transformer with Expansion Tank

The Eisler Engineering Co., Inc., 750 S. 13th St., Newark 3, N. J., has placed on the market an oil-insulated self-cooled type transformer with expansion tank, the purpose of which is to maintain the

PRENTISS



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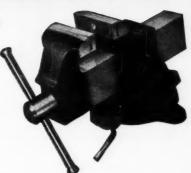
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Tool Room Specialties

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transformer oil as long as possible in good condition. The expansion tank, which is mounted directly on the cover of the transformer by means of structural steel supports, is connected with the main tank of the transformer, about half filled with the transformer oil, and provided with a gage to indicate the oil level, a ventilating breather, and necessary filler and cleanout holes.

Air residues, vapor, and condensed moisture are collected in the expansion tank, thus leaving the insulating and



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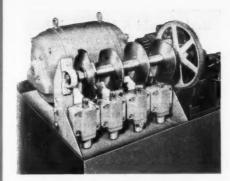
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Eisler Transformer with Expansion Tank

cooling properties of the transformer oil circulating through the coil windings undamaged. These impurities can be periodically removed from the expansion tank. The bent steel pipe bolted on the transformer cover and connected with the transformer oil room is normally tightly shut by a pressure relief diaphragm. The pipe provides a safety device, releasing the undue pressure inside the transformer through the suddenly burst diaphragm in case of any accidental occurrence.

Hufford Mechanical "Brain"

Originally designed for use with the company's hydraulic presses, the Hufford Mechanical "Brain" s h o w n herewith, product of the Hufford Machine Works, Inc., Redondo Beach, Calif., is adaptable



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Hufford Mechanical "Brain"

to widely varying types of hydraulic equipment. The unit is designed to produce a series of perfectly timed repetitive motions to multiple ram installations utilizing hydraulic cylinders.

The Hufford Mechanical Brain employs a series of specifically designed cams machined for specific operations and mounted on a single shaft which is motor driven through a hydraulic transmission. The variation of speed is infinite over the desired range. As the cams rotate they depress the roller-bearing stems of actuating valves, thus permitting or cutting off the flow of hydraulic fluid operating the cylinders. The cams can be altered to provide for different actions, with the number of cams employed being determined by the number of cylinders to be controlled.

"Champ" Portable Hydraulic Pipe Bender

Known as the "Champ," a lightweight portable hydraulic pipe bender which is designed to permit smooth, uniform pipe bending operations to be performed at any desired location is now being marketed by the Electric Cord Co., 30 Church St., New York 7, N. Y. The unit comprises a hydraulic jack and frame, the combined weight of which is 83 lb. The removable hydraulic jack is designed to simplify service problems and can be used individually for many other purposes in addition to pipe bending.

According to the manufacturer, the open jaw construction of the Champ Portable Hydraulic Pipe Bender provides



2807 W. Fort St.,

Detroit 16, Mich.



"Champ" Portable Hydraulic Pipe Bender in Use

for high speed production. The 30-inch steel frame is electrically welded and heavily reinforced. The Champ is supplied complete with 34, 1, 114, 2, and 21/2-inch dies.

Cut Boring Costs



Blind Hole Bottoming

Many enthusiastic users report that the Behr Boring Bar actually pays for itself in the first four weeks of operation. Just ask the man who uses one.

This new patented bar is chatter proof, extremely accurate and ultra efficient. Has interchangeable blades and accessories. It is unequalled for versatility and effi-

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BEHR PRODUCTS COMPANY WARREN, MICHIGAN

Surfaceweld A Improved Hard Surfacing Powder

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An improved hard surfacing powder, designated as Surfaceweld A, has been made available by The Lincoln Electric Co., Cleveland 1, Ohio. The powder, which is intended for application with a carbon electrode, is used for depositing a thin chromium carbide type of hard surface that is highly resistant to abrasive wear and corrosion.

One of the outstanding characteristics claimed for Surfaceweld A is its ability to be used with an a.c. arc with a single carbon electrode. The powder may also be applied with a twin carbon arc or may be used with d.c., carbon electrode negative. Surfaceweld A is particularly designed for surfacing applications involving thin work, thin deposits, or small a.c. welders. It may also be used for certain conditions of severe abrasion. The powder forms a paste when mixed with water which is said to adhere to flat and curved surfaces.

According to the manufacturer, the hardness of the smooth dense deposit of Surfaceweld A is approximately 54-61 Rockwell C for one layer and 57-63 for multiple layers. The deposit is said to develop full hardness in the as-deposited

MAKE WASHERS AND SHIMS

Up to 1/8" Thickness IN STEEL—PLASTIC—MICA—RUBBER, ETC.



This handy shim and washer die set plerces the thinnest of shim stock or up to 1/16" through mild steel, without burring. Punch sizes are 3/16" to 1" in 1/16" or %" graduations. 28 washer combinations. Made of high grade tool steel hardened and drawn to withstand shock without breakage. \$39.50 per set. Write for complete specifications. Finished Wooden Case \$4.75 extra. When ordering specify $\frac{1}{4}$ % or ½ graduation.

DAVIS & LARRICK MFG. CO.
Box 191, Route No. 2, Dayton 10, Ohio

condition; maintain hardness and resist scaling at elevated temperatures. Surfaceweld A is claimed to be of particular advantage in hard surfacing the cutting edges of mixing blades, drill bits, forming dies, scraper blades, hoes, shovels, garden tools, farm implements, and so on. The powder is available packed in convenient 1-lb. cans.

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No. 77 Shim Stock Wall Rack

For the convenience of shim stock users, the Laminated Shim Co., Inc., Glenbrook, Conn., has brought out a



No. 77 Shim Stock Wall Rack

sturdy metal wall or bench rack, designated as the No. 77, which is designed to hold any four gauges of the company's 6 x 100-inch brass or steel stock rolls. The stock is packaged in thicknesses from 0.001 to 0.012 inch, and the purchaser may choose the four gauges for which he has the greatest use.

Magna-Lock Model HR-510-C Magnetic Chuck

The Hanchett Magna-Lock Corp., Big Rapids, Mich., is now producing a magnetic chuck especially suited for use on small machines and for bench work. Designated as the Magna-Lock Model HR-



You abrasive users—you're the best pals a guy ever had! You latched onto our RED COAT Abrasives and hung onto them like a puppy to a root.

But more! You told your friends about them—how they CUT BETTER, LAST LONGER . . . And sales boomed!

You made it possible for us to open a second big modern plant—just for fabricating Michigan RED COAT Abrasives . . . So, "Thanks a Million!"

And say—if YOU haven't tried these famous RED COAT Abrasives—



today—Samples that let you SEE and FEEL the difference.

IN EVERY TYPE YOU WANT!

(Supplied in Belts, Discs, Rolls and Sheets—paper or cloth backed—in Silicon Carbide, Aluminum Oxide, Garnet—in full range of standard grit sizes.)

MICHIGAN ABRASIVE CO. 2360 W. Jefferson Ave. Detroit 16, Michigan



ABRASIVES
'The Humidity Controlled Abrasive'



Magna-Lock Model HR-510-C Magnetic Chuck with Separate Rectifier

510-C, the precision built chuck is said to have the same laminated faceplate design as utilized in the larger Magna-Lock models. With the chuck, workpieces are held to the extreme edges of the face-plate, thus providing for an unusually large magnetic area and uniformly distributed holding power. The Hermeti-Coil construction is claimed to make the chuck moistureproof and impervious to coolants or cutting oils.

The Magna-Lock Model HR-510-C Magnetic Chuck has a 5 x 10-inch working surface and is 4 inches high. The unit is furnished complete with a separate rectifier and built-in switch, ready for plugging into an alternating current type of

circuit.

THIS CARBIDE GRINDING TEAM Cuts Costs!

WICKMAN-NEVEN BENCH GRINDER

—designed especially for grinding or lapping carbide. Has special reversible 1 HP motor, 12 gal/hr. coolant pump, easily adjustable table, swiveling wheel guard.



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STEEL-BONDED DIAMOND WHEELS

—practically indestructible with extra long life. Diamond particles stay in place until completely worn. Finish tools better for longer tool life.

RESINOID-BONDED DIAMOND WHEELS

—for faster and freer carbide cutting and less frequent wheel dressing.

STEEL-BONDED CHIP-BREAKER DIAMOND WHEELS

—with many times the service life of other chip-breaker diamond wheels. Reduce wheel and tool costs materially and speed grinding 3-4 times.

GET THE FACTS

Complete information on these Wickman products is yours for the asking. Write today.



15533 WOODROW WILSON AVE. DETROIT 3, MICHIGAN

"Normal to Helix" Thread Chart

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For those whose gaging practice requires the staging of American National Form threads to the correct helix angle, the Engineers Specialties Division, The Universal Engraving & Colorplate Co., Inc., 980 Ellicott St., Buffalo 8, N. Y., is offering a "Normal to Helix" Thread Chart which covers the range of standard thread sizes for Class 2 and Class 3 fits. Since these threads are gaged normal to the helix, requiring a curved pitch for the requisite helix angle, a separate contour is shown for every thread size. Thus, to cover the 6-32, 8-32, and 10-32 threads, three separate contours are placed on the single thread chart. To establish positive alignment of the thread shadow with the chart contour, one thread flank is shown as

"Normal to Helix" Thread Chart

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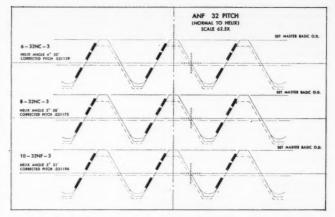
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a black band and the full tolerance on thread thick-ness is seen on the opposite flank of the thread contour. This black band also serves to check "drunken" threads and flank angles.

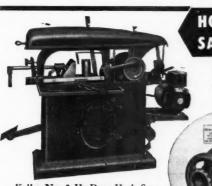
When the thread shadow is brought into alignment with the black band, no light should be visible

between the band and the shadow. A scale graduated in 0.001-inch increments is provided at the pitch line intersection of the opposite flank, thus enabling the operator to easily read any out-of-tolerance measurement. Each thread contour carries a set line for coordination of the chart-gage with the staging fixture which corresponds to the basic O.D. of the



thread being checked.

The Normal to Helix Thread Chart is available at 50X and 62.5X for the pitches 12-80, Class 2 and Class 3. For pitches from 6 to 11 in both class fits, the chart is supplied at 31.25X. The chart is offered in a 6% x 9%-inch size replacement screen for use on the small J&L bench comparator and in a 10 x 12-inch size



Keller No. 3 Hy-Duty Hack Saw with adjustable feed control, automatic lift on reverse stroke, adjustable foot lift, and many other time and money saving features. HOW TO REDUCE YOUR HACK SAW CUTTING COSTS....

Use the KELLER Power Hack Saw with patented 0 - 70 lb. blade pressure control.

Cut everything from thin wall tubing to heaviest bar stock with huge time savings. A quick easy turn of a new feed control applies the proper pressure to the hack saw blade. You get maximum cutting speed without injury to saw blades.

This Keller No. 3 Hy-Duty Power Hack Saw pays for itself quickly. Write for Bulletin 103-M today for complete specifications.









2363 UNIVERSITY AVENUE ST. PAUL 4, MINNESOTA overscreen style for use on AO optical projection comparators, Kodak contour projectors, 14-inch and larger Jones & Lamson comparators, Bausch & Lomb contour measuring projectors, Wilder projectors, and certain model Portman comparators.

Darra-James 15-Inch Drill Press

A 15-inch drill press available in both bench and floor models with either standard or oil table is now being marketed under the trade name of Darra-James by the Toolkraft Corp., 449 Meadow St., Waterbury, Conn. Features of the ma-

LEATHER • CANVAS • SHEEPSKIN • LEATHERETTE RUBBER



Die-cut leather pieces

Special shapes cut, sewed, glued, embossed, eyeletted, assembled to order.
Samples and estimates furnished promptly.

NORTHLAND SALES & MFG. CO.

1445 N. 5th St.

Milwaukee 12, Wis.

chine include a safety head which completely encloses the mechanism for full protection to the operator. The one-piece crown casting is hinged to the main section of the head and can be quickly opened for belt adjustments.

Thetwoflat sides of the %-inch spindle of the machine ride in a sleeve with corresponding maximum drive contact with the driving pulley. The quill return tension is adjustable by a spring-cap control. The depth gage of



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Darra-James 15-Inch Drill Press

the press is accurately graduated in $\frac{1}{18}$ inch from 0 to 4 inches. Stop nuts are provided to permit repeated drilling to the same depth. The 3-inch column of the machine is claimed to afford complete stability in all operations.

Glover Toolmakers' Wiggler

The Glover Mfg. Co., 736 Mohican Place at Randolph Court, Meadville, Pa., is now marketing a toolmakers' wiggler which, it is claimed, is designed to permit the spindle of a machine to be lined up so that a hole or slot can be located to a tolerance of less than 0.0005 inch from any desired flat or round surface in two or three minutes. The tool can be used to accurately locate holes by operators of jig boring machines, vertical milling

SOMETHING NEW . . .

TRUE CENTERS TRANSFERRED Instantly

WITH UNIVERSAL TRANSFER PUNCH

No Layout, Measuring or Scribing required—Automatically centers and squares itself with finger tip pressure.

(3 Sizes: ½ x ½,", 3/16 x ¾," and ¼ x 1")

Tool Specialty Salesmen Wanted

Universal Transfer Punch, Inc.

Dept. M, Box 412,

Massillon, Ohio





Glover Toolmakers' Wiggler

machines, horizontal milling machines, and boring mills.

The Glover Toolmakers' Wiggler con-

sists of two parts that are held together by adjustable spring tension and is made of high-grade non-deforming tool steel which is hardened to Rockwell C62-64 and ground to close tolerances. A %-inch collet or a drill chuck can be used to hold the wiggler in the machine spindle which may be power rotated at any speed from 300 to 1000 r.p.m. In use, the short part of the wiggler jumps sideways at the instant the proper location is obtained and rotates on a different center than that of the upper half of the wiggler. A fast method of locating holes in several pieces is said to be provided by using a vertical milling machine with a stop on the machine vise. The first piece to be drilled is placed in the vise up against the stop and the machine spindle located the desired distance from the outside surfaces by using the wiggler. All pieces are then center drilled, after which the holes can be drilled either in the same machine or in a drill press. The tool is supplied in a plastic tube with a metal screw top for protection while not in use and is said to require a tool box space of only ¾ inch in diameter x 3 inches long.

Graham-Mintel Two-Channel Inspection Gage

Intended for the fast, definite, simultaneous inspection of two diameters, the Graham-Mintel Two-Channel Inspection

Hanchett Magna-Lock

MAGNETIC KNIFE BAR

With the Exclusive

LAMINATED TOP PLATE



Again With a Chuck That
Holds Knives "Where It Counts"

Another first in efficient magnetic work holding, this new knife bar will give you 22% more work area . . . enable you to hold knives firmly to the extreme edges of the chuck . . . resulting in better accuracy, more production.

It's ideal, too, for grinding many small pieces at an angle, the all-steel top plate giving more uniform distribution of holding power.

Two types available—an inexpensive bar without T-slots and the standard type.

WRITE TODAY FOR BULLETIN MM-29



HANCHETT

MAGNA-LOCK CORP.

Magnetic Chucks and Devices
BIG RAPIDS, MICHIGAN, U. S. A.

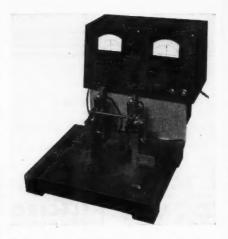
Gage illustrated herewith has been developed by the Graham-Mintel Instrument Co., 2443 Prospect Ave., Cleveland 15. Ohio. The induction type measuring heads of the unit are said to operate without friction and are provided with a 0.025-inch range of fine adjustment for ease in setups to various sizes and fast corrections for wear. Each head is independently adjustable, with zero setting being made to masters. In many cases, the heads can be applied to existing stands with but a few changes, or stands best suited to the range and sizes of workpieces can be supplied.



AERO TOOL COMPANY 6930 Avalon Bd., Los Angeles 3, Calif.

Mill Supply dealer order direct.





Graham-Mintel Two-Channel Inspection Gage

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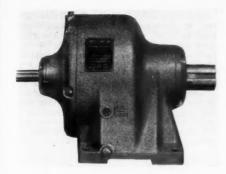
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The amplifier of the Graham-Mintel Two-Channel Inspection Gage is designed for operation on 110 volts, 60 cycles and is voltage regulated from 95 to 125 volts. Two continuous linear scales provided are divided into half thousandths of an inch or in half-tenths of one thousandth of an inch, having approximately 5-inch spacing per thousandths or tenths, thus allowing fast readings to 10 millionths of an inch.

"Winsmith" Differential Speed Reducer

A helical gear differential speed reducer featuring compactness, high efficiency, direct centered load distribution, rigid and vibrationless mounting, unusually large area for heat radiation, and quiet-





"Winsmith" Differential Speed Reducer

ness of operation is now being produced under the trade name of "Winsmith" by the Winfield H. Smith Corp., Springville, Erie County, N. Y. According to the manufacturer, the design provides for high overhung load capacities for maximum operating economy and efficiency.

The gears of the Winsmith Speed Reducer are made integral and combined in a planetary frame to form a complete unified planetary element. Constantly

maintained smoothness of operation and equalized load distribution through all three sets of planetary gears are said to result. Ratios from 5 to 1 to as high as 50,000 to 1 can be provided with no increase in the number of parts. The horsepower ranges from 0.62 to 81.5. The reducer is available in six sizes for every phase of industrial service and is made in horizontal, vertical, and flange-mounted styles.

Max-WELL-Made Small Size Series "R" Recessing Tools

The Maxwell Co., 325 Broadway, Bedford, Ohio, has announced the addition of two small size tools to its line of MaxWELL-Made Series "R" recessing teols. According to the manufacturer, the small size tools are comparable in capacity to standard tools in the line but their extremely small dimensions permit their use in applications where larger recessing tools cannot be used.

The Max-WELL-Made Small Size Series R Recessing Tools each have a micrometer-adjusting collar which is said to facilitate rapid and accurate recess diameter control to within 0.001 or 0.050 inch



5



Max-WELL-Made Small Size Series "R"
Recessing Tool

per tool revolution. In addition, the tool-holding section has serrated clamp blocks which match identical serrations on cutter shanks to provide a positive interlock and to prevent turning of the cutter in the workpiece. Each tool also features precisioned hard-chromed wearing surfaces to assure maximum life. The section into which interchangeable shanks are fitted is designed to provide for maximum strength. A mandrel-built bellows type rubber guard is furnished as standard with each tool to prevent the entry of chips and other foreign matter into the working mechanism.

The Max-WELL-Made Small Size Series R Recessing Tools have overall lengths of 21% and 4 inches and are available for cutting recesses from % to 1 inch and from 1 to 2 inches respectively. Cuts can be taken at an extremely high rate of feed. The tools can be furnished having a cutter ratio of either 1:3 or 1:1. The cutting action is described as smooth and is said to require only finger-tip feeding pressure. If desired, cutters can be supplied to produce multiple recesses. Cut location can be made from either top or bottom surfaces.

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Optional Features for Numatics Hand Valve

Numatics, 100 S. Main St., Milford, Mich., announces that its hand valve is now being offered with many optional features to meet a wide range of specific applications. In addition to the regular horizontal lever, the following variations are now available: (1) upright lever for steel mill use, manipulators, crane control, or any place where an upright lever conforms to other control; (2) double chain lever for hoist control, door actions, or installations requiring overhead moun-



ting; and (3) V-cam or dog trip lever for automatic reversing or reciprocating actuation.

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The Numatics Hand Valve has a combination side and bottom port base to provide for mounting options and is available in both locking and non-locking action types. Additional features include a soft lever action; 40-degree total movement; shielded lever mechanism; pressure-sealed design with no springs or stuffing boxes; and few parts, all non-corrosive. According to the manufacturer, the valve can be permanently installed without pipe headers or mounting brac-



Numatics Hand Valve

kets and can be serviced without the use of special tools and without disturbing pipe installations.

G. E. Surface Roughness Scale Set

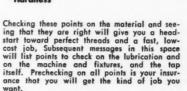
A pocket-size surface roughness scale set for sight and feel comparison with machined finishes has been announced by the Special Products Division, General Electric Co., Schenectady 5, N. Y. The set is composed of two small metal rules each 6 inches long x 1½ inches wide which llustrate degrees of roughness ranging from the smoothness of a bearing surface to the roughness of a flame cut. One side of each scale is divided into 12 surfaces, depicting a total of 24 different surfaces which are grouped into 10 degrees of sur-



Most troubles that occur on routine tapping jobs can be easily avoided by a little attention before the job starts. There are just four things to check — the material to be tapped, the machine and fixtures, the lubrication and the tap. The following list indicates the points to check on the material or work piece.

Check Piece Being Tapped For:

- Hole size too small?
- Is hole perfectly round?
- Does tap enter hole straight?
- If a blind hole, is there clearance for chips?
- If a blind hole, does tap hit bottom?
- If a cast hole, is there sand in hole?
- Is wall work-hardened by dull drill or by punch?
- If casting is piece annealed?
- Hardness



When technical problems occur, have our engineers give you a complete analysis and recommendation. Send complete data — material, depth and diameter of hole, whether hole is through or blind and type of lubricant used. We will be glad to give you definite suggestions. No obligation.

The Wood & Spencer Company





"milled from the bar" screw machine products that stand up under hard usage... and build up sales through customer demand?

WM G. Ottemiller

... of course!

Write today for the new eye-catching folder that illustrates and describes our famous line of ...

CAP SCREWS • SET SCREWS •
COUPLING BOLTS • and MILLED STUDS
in all sizes and threads



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G.E. Surface Roughness Scale Set

face roughness. Every degree is identified by a number which designates the nominal roughness in micro-inches (average).

Weighing only 3 oz., including the leather case, the G.E. Surface Roughness Scale Set enables engineers and draftsmen to visualize, select, and specify surface characteristics for production work and machine operators and inspectors to determine by sight and feel comparison whether surfaces meet designated specifications.

Miggrome
LAY-OUT AND
IDENTIFICATION DYE

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for trial sample and circular.

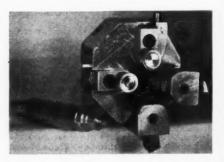
MICHIGAN CHROME & CHEMICAL COMPANY
6340 E. Jefferson Ave. - Detroit 7, Mich.

Multi-Micro Cut Box Tool

Identified as the Multi-Micro Cut Box Tool, a special multi-tooled short cut box tool that is designed to provide for all-around setup versatility is announced by the Multi-Micro Cut Tool Co., 3106 4th Ave., S., Minneapolis, Minn. With the tool, up to six different shoulder cuts can be taken and, since there are two rollers exerting equal pressure, repeated accuracy is said to be assured.

According to the manufacturer, the

Multi-Micro Cut Box Tool



Multi-Micro Cut Box Tool allows for complex setups, eliminates unnecessary setups, and simplifies setting-up operations. The two tool arms are adjustable to center and, if simple work is being performed, one tool arm can be removed. The tool has an adjustable range of from ½ to 1½ inches and is made so that different size shanks can be used.

Weltronic Model 312KS2 Multiple Control Combination

A three-phase multiple control combination offering unusual versatility is now in production by the Weltronic Co., 19492 W. Eight Mile Rd., Detroit 19, Mich. The remote control relay-timer incorporated in Model 312KS2 provides for a variety of multiple welding sequences (Weld No. 1, No. 2, No. 3, cascade, or simultaneous) with independent dial adjustment of weld time on each phase. Automatic control circuit protection is incorporated. A built-in disconnect switch or circuit breaker is available so that power may be wired directly to the unit. A circuit breaker with interrupting capacity to 50,000 amperes may be supplied.

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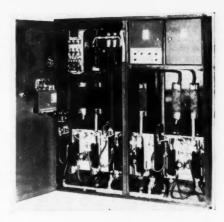
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Weltronic Model 312KS2 Multiple Control Combination

Standard equipment of the Model 312KS2 includes a built-in Weltronic water saver with solenoid-operated water valve and water lines housed within the cabinet. A magnetic contactor for remote

MULTIPLE DRILLING with a...



MULTI-DRILL

Increases Capacity Up to 800%
ADJUSTABLE TO ANY HOLE PATTERN
. . . FITS ANY DRILL PRESS

If your production requires drilling from 2 to 8 holes in a work piece, a MULTI-DRILL will cut costs and speed output up to 800%. The MULTI-DRILL is universally adjustable to any hole pattern—is compactly built to permit easy, unhampered operation with drill jigs or other special fixtures. Ruggedly built to take the wear and tear of high production work, the MULTI-DRILL will handle your long and short run multiple drilling jobs with ease and economy. The MULTI-DRILL will drill on hole centers as close as ½"—handle drill sizes up to ¾" in steel. Special adaptations available.

There is a Commander MULTI-DRILL Distributor in your area. Write for bis name, literature and complete details.

COMMANDER MFG. CO.

Product of Commander - Builder of the Commander Tapper

control or motor starter is offered, and a 1 to 3 kva step-down transformer is available to supply auxiliary equipment. Complete control over 3, 6, or 9 transformer groups may be accomplished using auxiliary timers.

Matco Wheel Dresser

The accompanying illustration shows a handy wheel dresser for surface and cylindrical grinders which has been developed by the Matco Tool Co., 2830-36 W. Lake St., Chicago 12, Illinois.



USED FOR 30 YEARS IN TOOL ROOMS AND PRODUCTION SHOPS FOR PRECISION BORING

Head No.	Body Dis.	Maximum Bar Capacity	Micro Offset	Price		
6	176"	36"	% **	\$ 22.		
	314"	14"	36"	30.		
10	4"	86"	1/2"	70.		
12	4"	3/4 **	1"	45.		
20	71/3"	11/2"	1"	125.		
30	4"	34"	114"	70.		
32	514"	1"	2"	115.		
35	4%"	**	116"	8.5		
36	6%"	116"	2"	150.		

FLYNN MANUFACTURING CO.



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Matco Wheel Dresser Set Up for Use

According to the manufacturer, the unit is designed to eliminate the necessity of stopping and starting the machine, removing and replacing work on the chuck, and lowering and raising the wheel head for dressing the grinding wheel. In addition, the time required in locating the diamond for dressing the wheel is said to be negligible. Moreover, the dresser is claimed to reduce wheel and diamond accidents to a minimum.

Knu-Vise Model AO-400 Air-Operated Clamp

An air-operated clamp designated as the Model AO-400 has been added to the Knu-Vise line of products manufactured

VIKING

312

INSERTED SOLID CARBIDE TOOLS WITH MECHANICAL LOCK

Interchangeable

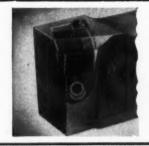
shanks and arbors.

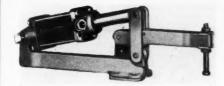
A modern tool holder designed especially for efficient, economical use of solid carbide inserted tool bits. Eliminates ground in chipbreakers and brazing strains. Provides quick change tool bits and low reconditioning costs.

Shank dimensions from 3/4"x3/4"x41/2" to 11/2"x2"x7".

Choice territories are open for sales representation. Write for information. Write for folder.

VIKING TOOL CO., SHELTON, CONN.





Knu-Vise Model AO-400 Air-Operated Clamp

by Lapeer Mfg. Co., 3056 Davison Rd., Lapeer, Mich. Particularly useful for re-

mote controlled as well as multiple clamping jobs, the clamp, which has a maximum clamping pressure of 400 lb., is double-acting and, it is claimed, will not release clamped work in the event air pressure accidentally fails. The unit is said to hold parts securely under such conditions and to remain locked until air pressure is applied to open the clamp. The operating air pressure is 85

pounds.

To produce the proper cushioning effect and avoid hammer-like action when closing or opening, the clamp is provided with restricting fittings which can easily be removed if not wanted for certain applications. With the clamp open, the length of the unit is 9% inches and the height, 8 inches. With the clamp closed, the length is 13 inches and the height, 4 inches. The overall width is 21/4 inches.

The cylinder used in the clamp is available separately for use independently of the

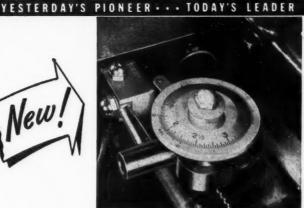
toggle-action clamp for pushing or pulling, or as a means of creating hydraulic pressure. It has a 11/4-inch bore and 2%inch stroke, and is designed for 250 p.s.i. air pressure. The cylinder is also available to withstand pressures up to 2,000 pounds per square inch.

Superior Multi-Purpose Faceplate and Attachments

ments whereby a lathe can be quickly and easily converted into a milling ma-

A multi-purpose faceplate and attach-





EASURING ATTACHMENT

for Lathes Reading) Saves Time • Reduces Waste

• This handy Weldon attachment measures directly the forward or reverse movement of the lathe carriage, within .001 of an inch. Easily attached to most lathes by drilling and tapping of one hole. • Dependable, accurate, convenient - saves time and reduces work spoilage.

Write for Circular LA-1



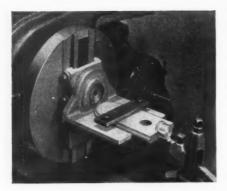


Illustration Showing Superior Multi-Purpose Faceplate Equipped with Angle Plate Attachment for Holding Work for Turning, Drilling or Facing

hine, boring machine, or drill press handling regular or odd shapes and sizes of work is now being offered by the Superior Manufacturing Co., Dept. R, 1302 Ontario St., Cleveland 13, Ohio. With this equipment, bar stock or castings can be drilled, bored, milled, or ground, and op-

erations at any radial or angular relation to each other can be performed without moving the work from its original position in a fixture.

Designed to permit complicated work to be performed on machines without the need for highly skilled labor, the attachments, in addition to the faceplate and adapter, consist of a vertical V-block, an auxiliary T-slot faceplate, a three-jaw chuck, an angle plate, and a horizontal V-block with clamp.

Kennametal Planer Tool

A tool with brazed-on tip of unusually strong Kennametal Grade K1 for use in planing cast iron on modern types of planers having clapper box lifts is announced by Kennametal Inc., Latrobe, Pa. The tool is available in two styles designated as the 15PM and 16PM. The Style 15PM is a square nose tool for finishing when the feed per stroke is almost as great as the tool width, and the Style 16PM (Illustrated) is a round nose tool for planing in a trough by plunging and feeding both ways.

The Style 15PM is made in shank sizes of $\frac{1}{2}$ x2, $\frac{3}{4}$ x2, 1x2, 1x2 $\frac{1}{2}$, 1x3, and $\frac{1}{2}$ x3



ROYAL PRODUCTS

MINEOLA, N. Y.



BALL BEARING

Used for station drilling and milling; often replacing expensive jigs. Markers enable operator to locate station easily. Also manufacturers of worm and wormwheel operated Rotary Tables—11 models, 8 sizes, 9" to 25".



TROYKE MFG. CO. Cincinnati 9, Ohio, U. S. A.

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Kennametal Style 16PM Planer Tool

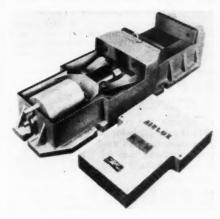
inches. The Style 16PM is available in shank sizes of $\frac{3}{4}$ x2, 1x2, $\frac{1}{2}$ x2, and $\frac{1}{2}$ x2 $\frac{1}{2}$ inches.

"Airlox" Senior Model S-200 Pneumatic Vise

Designed primarily for production work holding operations on 40 to 50 h.p. milling machines, the "Airlox" Senior Model S-200 Pneumatic Vise illustrated has been placed on the market by Production Devices Inc., Whitehall, N. Y. The vise provides a gripping power ratio of 200 to 1; thus, with 100 lb. of air in the line, a grip of 10 tons is exerted on the work. The vise is so designed that an air line pressure of 200 lb. can be safely used on the vise if that much jaw squeeze is desired, the manufacturer states.

Specifications of the Airlox Senior Model S-200 Pneumatic Vise are as follows: length overall, 45 inches; width overall, 13½ inches; height overall, 8¾ inches; weight, approximately 575 lb.; jaw width, 3 inches; jaw stroke, adjustable from 18

"Airlox" Senior Model S-200 Pneumatic Vise



Save TIME APS ROUBLE with the New Improved VIKING TAPPER



You save time because the Viking Tapper eliminates the wasting of valuable time by highly paid skilled men trying to tap holes accurately by hand. One fifth the time is required.

You save taps because tap breakage is practically done away with. This enables the use of high speed ground thread taps at lower cost than carbon taps. The savings on taps alone will pay for the tapper in a short time.

You save trouble because Viking Tappers take the trouble out of tapping. Stand or bench model. Adapters available in eight sizes.

in eight sizes.

For Precision Tool Room Tapping use the Viking Tapper. Capacity 1/4" to 7/8".

ILLUSTRATED BULLETIN SENT ON REQUEST.

THE VIKING TOOL & MACHINE CORP.

2 MAIN STREET,

BELLEVILLE, N. J.

inch minimum to % inch maximum; and maximum jaw opening, 12 inches between castings.

Miller Model MSW Timer Control

The Miller Electric Manufacturing Co., Appleton, Wis., has announced a timer control for use with its Model MSW portable spot welder which is said to assure maximum efficiency and improved and more uniform "spots," increase the life of the tips, and make the spot welder sat-

GEM MACHINE VISES For TOOL-ROOM or Production.



Six sizes, 3" to 12". Many exclusive features. You see them everywhere. Write for circular. J. E. MARTIN MACHINE WORKS

Springfield

Ohio

THOMPSON'S





This Modern Wheel Dresser operates on a resilient bushing. It offers lower initial cost, sharper tools and a smooth shock-proof dressing action. Write for complete details. You should have one by each grinder.

THOMPSON MFG. CO. P.O. Box 627



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Miller Model MSW Timer Control in Use with Portable Spot Welder

isfactory for production spot welding.

Designed for mounting on the wall or on a workbench, the control is an N.E.M. A. Type 1A which is adjustable to provide from 3 to 120 cycles (1/20 to 2 seconds) and is intended for operation on 60 cycles, 110 or 220 volts. The cycle to be used is selected by adjusting a control on the case. A numbered indicator disc geared to this control indicates the cycles in use. A switch on the case enables the operator to quickly turn the timer on or off.

Whale Hack Saw Frame

Designed to provide for working comfort, balance, and durability, a hack saw frame announced by the Forsberg Manufacturing Co., Bridgeport, Conn., fea-

WALTHAM SUB-PRESSES



Babbitt bearing is tapered on outside and can be forced downwards. This reduces inside diameter to fit plunger when latter becomes worn through use. Exact alignment and constant precision can be maintained throughout life of die. Made in 9 sizes.

Write for further information.

WALTHAM MACHINE WORKS, INC.



WALTHAM, MASS.



Whale Hack Saw Frame

tures a pistol-type grip of finger-fitted "Hammerlock" design, shaped and set to provide for ease of handling and minimum cutting fatigue. The frame is made of attractive nickel-plated stock and is

adjustable for 8 to 12-inch blades, which may be faced in four directions.

The saw frame is available in two models designated as the Whale Model No. W21 and Whale Model No. W61. The Model No. W21 (illustrated herewith) includes a rubber grip, while the Model No. W61 has a rubber composition grip. Each model is supplied complete with a 10inch blade, ready for use.

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Modern Self-Aligning Die Lifter

self-aligning die lifter for the safe and convenient handling of dies, machine tools, and other heavy objects is announced by the Modern Collet and Machine Co., 401 Salliotte St., Ecorse 18, Mich. The device consists of (1) a swiveling eye which accommodates standard lifting hooks, and (2) a stud assembly at the bottom which turns as a unit for attaching and removing the die lifter. The stud can be quickly clamped at the proper depth by turning the round nut inside the eye until the collar at the bottom seats against the object to be lifted. Since the eye swivels freely at all times, the stud cannot work loose, it is claimed.

The Modern Self-Aligning Die Lifter is available in four sizes with maximum lifting capacities of 16, 28, 40, and 100 tons each. Studs are of 4, 1, 14, and 1½inch diameter respectively and have U.S. Standard threads. For maximum strength and safety, all parts are made of heat-



CONDITIONING

Universal Cutter and Tool Grinder

with Motor and Standard Attachments-**Pedestal Extra** F.O.B. Benton Harbor

The Excel No. 6 is designed to accurately sharpen reamers and milling cutters of a wide variety of shapes and sizes and is also adaptable to cylindrical and internal grinding. Special attachments are available to convert the No. 6 to a multitude of uses in the tool room. Handy storage space for accessories in base.

Swings	work							8	PI	dia	m	eter
Table	surface									.4"	×	24"
Floor	space									36"	×	48"

Write for free descriptive literature and name of nearest dealer.

Designed and Manufactured by

COVEL MANUFACTURING CO. BENTON HARBOR, MICHIGAN

DEPT. MM-29

Excel No. 6 Universal Cutter

and Tool Grinder

Longitudinal table travel......14" Cross movement of saddle 61/2' Vertical movement of grinding

wheel spindle

STOP



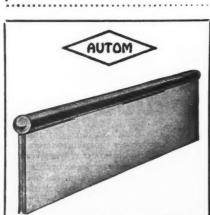
ELK TOOL HOLDERS, Precision Built, eliminate bit vibrations. Universal—Straight, Right or Left Hand Positions. ONE will replace TEN single purpose Tool Holders.

Write for Bulletin

ELK TOOLS, Inc.

71 W. Broadway

New York 7, N. Y.



CONTINUOUS HINGES

Manufactured by

AUTO MOULDING & MFG. CO.

WRITE FOR STOCK LIST

1114 E. 87TH ST.

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Modern Self-Aligning Die Lifter

treated alloy steel of over 180,000 p.s.i. tensile strength, and the swiveling eye is designed to line up with the pull to eliminate twisting stress.

K-E Diamond Disk Wheel

Said to provide for unusual cutting efficiency, the K-E Diamond Disk Wheel shown in the accompanying illustration has been placed on the market by K-E Industries, 253 Plymouth Bldg., Minneapolis 2, Minn. The diamond face of the unit may be readily replaced, thus providing

K-E Diamond Disk Wheel



for maximum economy on all grinding operations requiring the use of diamond wheels, it is claimed.

Useful for small shops as well as large industrial plants, the K-E Diamond Disk Wheel may be employed on ordinary bench grinders as well as carbide tool grinders.

Wilton Improved "Powrarm" Positioner and Work Holder

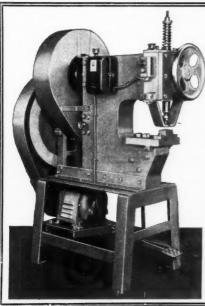
The Wilton Tool Manufacturing Co., 936 Wrightwood Ave., Chicago 14, Ill., is now producing its "Powrarm" Positioner and Work Holder in two improved models, one mechanically operated for light work and the other hydraulically operated for heavy duty work. Both models are designed to position work at any desired angle on a 360-deg. horizontal or axial plane. or on a 180-deg. vertical plane, and are said to hold the work firmly under high pressures.

The Wilton Improved Powrarm combines the ball and socket joint principle with a simple, positive locking device that requires only slight pressure on a lever or hydraulic system to lock the work in any desired position. Work up



Wilton Improved "Powrarm" Positioner and Work Holder

to 150 lb. in weight can be held at any angle. Both models of the unit can be easily bolted to a workbench, or a special clamp is available to attach the Powrarm in any convenient location in the field or shop.



NEW - - - SINGLE END PUNCHING MACHINE

For Light Structural Fabricating.
Punches Web and Flanges of Beams
and Channels.
Punches Legs of Angles and Tees.

FEATURES: Steel Plate Frame

Non-repeat clutch
Punch lowered by hand wheel
for accurate centering

SPECIFICATIONS:

Capacity—9/16" through ½". Throat—12" Speed—60 strokes p. m. Motor—2 HP, 1800 RPM

JULIUS BLUM & CO., INC.

534 WEST 22ND ST., NEW YORK 11, N. Y. Telephone: WAtkins 9-7042

M-B Automatic Air Line Filter

Featuring a head and base made of bar duraluminum and machined to close limits, an automatic air line filter is now being offered in sizes of 1/4, 3/8, 1/2, 3/4, and 1-inch N.P.T. by M-B Products, 130-134 E. Larned St., Detroit 26, Mich. The bowl is made of transparent plastic and, as a consequence, the filtering element and foreign matter (water, oil, scale, dirt, and so on) filtered from the air are clearly visible, eliminating all guesswork as to when the filtering element should be cleaned or the bowl drained, it is claimed.

WADE ENVELOPES

Shop Orders, Drawings, Blueprints, Etc.

Made in three styles, trans-parent, fibre, and metal backs. Non-inflammable acetate windows. Special style or size to order. Write for details.

INSTRUMENT COMPANY Phone: CEDAR 4728

1422 E. 109th St., Dept. M., Cleveland, Ohio



FOR FASTER, SAFER SOLDERING

The Luma resistance method of soldering is the accepted way for small shops requiring single operation to large plants with many types of operations. Write for complete types of operations. Write for complinformation about this remarkable tool.

LUMA ELECTRIC EQUIPMENT CO. . O. Box 132-M.S.

Toledo 1, Ohio

The plastic material is said to withstand temperatures up to 150 degrees and a burst test of 500 pounds.

The ribbon type filtering element of the unit functions on the edge filtration principle and is claimed to positively remove solids 10 microns (0 .-00039 inch) and larger. Dirt can be removed from the edges of the filtering element by removing a vent plug from the head of the unit, opening a drain cock in the bottom of the bowl. and then blowing out the unit with an air nozzle. The base and bowl can be removed by unthreading one nut,



M-B Automatic Air Line Filter

after which the filtering element can be taken out by the removal of another nut in case the element should have to be replaced.

The M-B Automatic Air Line Filter is available in bowl capacities of 1/2 pint,

% pint, and 2/3 quart.

Wolf Type EG2C 1/4-Inch **Production Drill**

Identified as the Wolf Type EG2C, a 1/4-inch lightweight production all-ball bearing electric drill which is said to be particularly adapted to drilling opera-

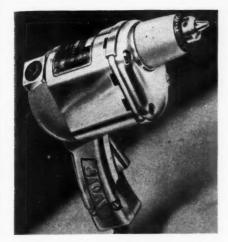


BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature. WATTS BROS. TOOL WORKS Wilmerding, Pa.

off

WE



Wolf Type EG2C 1/4-Inch Production Drill

tions in confined quarters is now being offered by Fred L. Stuart, Room 1111, 33 W. 42nd St., New York 18, N. Y. Low weight, short overall length, and off-set

spindle are design characteristics which contribute to the utility of the tool in close quarters. According to the manufacturer, the tool is sufficiently rugged as to be suitable for operation with a wide variety of bench accessories, such as a bench drill stand or bench grinder clamp, as well as for performing operations such as valve guide cleaning and decarbonizing. The Wolf Type EG2C Production Drill has a drilling capacity in steel of 1/4 inch and a net weight of 4% lb. The full load speed of the tool is 1,400 revolutions per minute.

Boston Type TAN Reductor

Designated as the Type TAN, a speed reducer featuring heavier gearing than its predecessor (Type TA) to provide for an increased horsepower rating has been placed on the market by the Boston Gear Works, Quincy 71, Mass. The worm is made integral with its shaft to add ruggedness and reduce the number of parts. Larger shafts are said to permit greater loads, and a one-piece streamline housing provides a larger area for heat radiation. The housing is accurately machined to assure precision assembly.



Top Rim STEEL STACKING BOXES 18" x 12" x 6". 16 Gg.

with Drop Handles

STANDARD SIZES

16 x 10 x 6. 18 Ga. 16 x 10 x 6.... 16 Ga. 18 x 12 x 6....16 Ga.

MADE IN OTHER SIZES

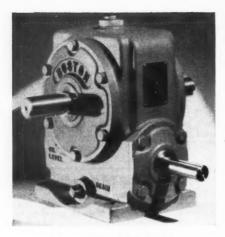


WE MANUFACTURE ALL TYPES OF STEEL BOXES

We make a specialty of boxes made to fit your particular handling requirements. Special boxes designed so they can be run thru with standards enable us to quote prices comparable with that of a standard box.

FACTORY EQUIPMENT CO

PROVIDENCE & L



Boston Type TAN Reductor

Improved oil seals are claimed to minimize oil leakage and reduce the friction of the seals on the shaft. A new vent valve incorporated in the filler plug permits the unit to "breathe" while preventing the entrance of foreign matter.

Except for shaft sizes, the Boston Type TAN Reductor is completely interchangeable with the present TA unit which it supplants, having the same shaft centers and mounting dimensions.

Parker-Kalon Socket Set Screw and Hex Key Assortments

Designated as the No. 225, an assortment of centerless ground socket set screws which is said to be free from nicks, burrs, hardening scale, and other imperfections is now being offered by the Parker-Kalon Corp., 200 Varick St., New York 14, N. Y. Designed for use in household appliances, heating equipment, farm implements, machinery, and so on, the assortment consists of 225 pieces as follows: 25 each No. 6 (32 x $\frac{\pi}{10}$); 25 each No. 8 (32 x $\frac{\pi}{10}$ inch); 50 each No. 10 (32 x $\frac{\pi}{10}$); 25 each No. 10 (32 x $\frac{\pi}{10}$); 30 each $\frac{\pi}{10}$ -inch (18 x $\frac{\pi}{10}$ inch); and 25 each $\frac{\pi}{10}$ -inch (16 x $\frac{\pi}{10}$ inch); and 25 each

As a companion to the No. 225 assortment, the company is also offering an assortment of engineered hex keys designated as the No. 125. Made of a special analysis alloy steel, the keys, which are heat treated to assure maximum resist-

"SKELTON" TAPER REAMERS The Roughing Reamer with two cutting edges ground radial on a

The Roughing Reamer with two cutting edges ground radial on a taper to correspond with hole to be reamed. Two opposite edges are "backed off" to govern chip thickness. This "safety edge" prevents "bogging in or "chattering." A special feature permits straight, centralized holes, even though turset is out of line with spindle. Write for Folder "S" describing Taper Reamers and



Finisher

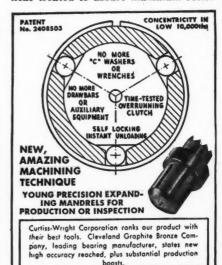
Morse, B & S and SAE Tapers in stock. Specials to order.

Dealer Territories Available

ONONDAGA TOOL CORP.

FAYETTEVILLE

NEW YORK



ROUGHLY SKETCH DESIRED MANDREL INTO YOUR PART PRINT AND FORWARD FOR QUOTES.

YOUNG ARBOR CO. • Ph. Tower 1-3076 2140 Scranton Road, Cleveland 13, Ohio

Boring Bars.

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Parker-Kalon Socket Set Screw and Hex Key Assortments

ance to torque stresses and freedom from brittleness, are intended for removing, tightening, and adjusting standard socket

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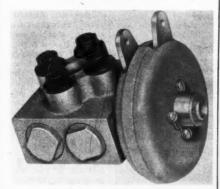
set and cap screws.

The No. 125 assortment consists of twenty-five 16-inch keys for Nos. 5 and 6 set screws; twenty-five 4-inch keys for No. 8 set and No. 4 cap screws; twentyfive A-inch keys for No. 10 set and Nos. 5 and 6 cap screws; twenty-five 1/4-inch keys for 1/4-inch set and No. 8 cap screws; fifteen 3-inch keys for 5-inch set and No. 10 cap screws; and ten is-inch keys for %-inch set and 4-inch cap screws.

Electrol Selector Valve

Electrol, Inc., Kingston, N. Y., announces a follow-up selector valve designed for manual or automatic operation. The valve, which can be adapted to mechani-

Electrol Selector Valve





STAYS ON THE JOB LONGER!

- removes more metal -produces more pieces -reduces down time



Typical production increases

Boring Steel Connecting Rods (3½" dia. hole) Pieces per grind TECO (Grade C)......60-70 Best previous carbide . **Turning Welded Steel Tubing**



TECO Cemented Carbide holds its cutting edges and maintains accurate tolerances for longer runs. You produce more pieces between grinds, get more grinds per tool. On job after job, production reports show increases of 100, 200 and 300% per tool over other car-bides, when TECO is used. The reason? Greater resistance to wear and breakage, due to rigidly con-trolled toughness, hardness and uniformity. Yet, TECO costs no more than other carbides. Try a run and learn its superiority. Specify TECO when ordering tools or blanks from your distributor or tool fabricator.

TUNGSTEN ELECTRIC CORP., UNION CITY, N. J.

Manufacturers of Tungsten Carbide-from ore to finished material-for over a quarter century.



cal hydraulic systems for such applications as maintaining equal tension, multiple brake actuation, furnace control, steering devices, marine and machine tool controls, is light in weight, easy to install, and available in sizes to meet specific requirements. reduce chatter. The tool includes three spiral flutes which provide for a maximum area of contact between the cutting



Aero Spiral Flute Countersink

Aero Spiral Flute Countersink

The Aero Tool Co., 6930 Avalon Blvd., Los Angeles 3, Calif., has announced a high speed steel spiral flute countersink which is designed to cut smoothly and

edge and the work and cut with a shearing action.

The Aero Spiral Flute Countersink is made in %, ½, and %-inch diameters

made in %, ½, and %-inch diameters with ¼-inch diameters with ½-inch shanks and ¾ and 1-inch diameters with ½-inc because of 60, 82, 90, and 100 deg., as well as others.

Vaco Duplex Reversible Screw Driver

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A duplex reversible screw driver which is designed to accommodate both Phillips and regular slot screws by merely reversing the blade is announced by the Vaco Products Co., 317 E. Ontario St., Chicago 11, Ill. The screw driver includes an oil-tempered chrome-vanadium steel blade which can be quickly and easily inserted in and removed from the handle. A unique positive spring action clutch in the center of the blade shaft is said to provide for foolproof chucking of the blade.

The Amberyl handle of the Vaco Duplex Revers-





Vaco Duplex Reversible Screw Driver

ible Screw Driver has fluted edges chamfered for comfort, with deep flute vacuum grip, and bears the Underwriters' Laboratories re-examination service marker. The handle is claimed to be shock and break-resistant and to be impervious to most alkalis and acids.

The Vaco Duplex Reversible Screw Driver is available in two sizes, one with No. 1 Phillips point and historic regular blade end and the other with No. 2 Phillips point and ¼-inch regular blade.

Heavy Duty "Kennamatic" Tools

Kennametal, Inc., Latrobe, Pa., announces a further expansion of its line of "Kennamatic" tools to include four heavy duty styles, two having square inserts and two having cylindrical inserts of solid Kennametal cemented carbide. These tools utilize the principle of mechanically holding an indexable Kennametal insert in a vertical position in order to make most efficient use of the high compressive strength of the insert.

Heavy duty Kennamatic Styles 3RK and 6RK have cylindrical inserts that are 1½ inches in diameter x 2½ inches long and are held in 2 or 3-inch square steel shanks. These styles are intended primarily for machining cast iron. Heavy duty

DRILL BREAKAGE Reduced 86.7%

Here's How It Was Done

Large automobile manufacturer, famous for production efficiency, gave us the following report of a test of the Erickson Collet Chuck. As a result of this test, manufacturer has standardized on Erickson Collet Chuck for this operation.

"Erickson chuck is used for drilling 1200 vent holes per day, average drill breakage one per day. We formerly broke fom 8 to 10 drills with the _____ chuck. Now have average breakage of 2 drills per 900 oil holes drilled in pistons with 1/8" Erickson Collet

NO OTHER COLLET CHUCK ON THE MARKET

- 1. Delivers accuracy of .0005"
- Permits collapse of 1/32" (Replacing 7 standard single purpose collets)
- 3. Grips drills on flutes—permits stubbing
- Gives such positive grip due to exclusive surface contact.

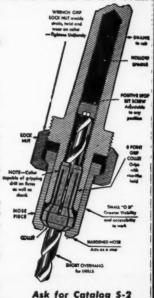
Chuck. Had breakage of 15 drills per 900 holes using old drill sleeve method."

Learn how this efficiency can be yours, tool Send for complete data on Erickson holding equipment now and learn how Erickson tools applied to your problems can boost production and reduce costs.

ERICKSON TOOLS DIVISION

2301-C Hamilton Ave.

Cleveland 14, Ohio



SCHERR aids to precision — production

Low-priced toolmakers' microscope



The WILDER

Here is at last—a precision checking tool that every shop needs, at a price that any shop can afford. Measures two ways with micrometer to .0005", or with gage blocks for closer accuracy. The image is on a clear glass reticule for maximum definition. Has understage lighting for restated to the control of

flected image. An essential instrument in today's precision demands, at a most interesting price. Write.

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Heavy Duty "Kennamatic" Tools

A real snap gage service —

ATLANTIC (adjustable limit) SNAP GAGES

Made in strict accordance with American Gage Design Committee specifications. Frames of Meehanite. Wide range of sizes, from .95 to 113/6". With round or square gaging pins, solid

anvil, extended anvil, etc. The last word in snap gages, and at most interesting prices. Write us for details—and also about the Scherr special service for trueing and setting worn gages.

Speed inspection with the SCHERR TOOL STAND

Cuts inspection time almost in half by freeing both hands of operator, and holding micrometer or snap gage in most convenient position. Also prevents body heat affecting tool readings. One of those small, inexpensive items worth many times its cost in saved time. Try a few—then order a quantity. Price, \$7.50.



Write for full details on these tools, and for the Scherr Small Tool Catalog.

GEO. SCHERR CO., Inc. 198-A. Lofayette St. New York 12, N.Y.

11SK and 12SK are available in two shank sizes—2 inches square having 1 x 1½-inch square Kennametal inserts and 3 inches square having 1½ x 2-inch square Kennametal inserts.

Thor "Silver Line" 1/2-Inch Drill

A 7-lb. portable electric ½-inch drill designated as the Thor "Silver Line" is announced by the Independent Pneumatic Tool Co., 175 State St., Aurora, Ill. Designed for continuous stall-free

Thor "Silver Line" 1/2-Inch Drill



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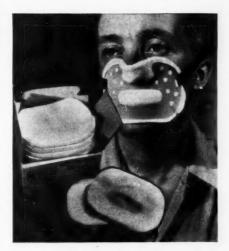
drilling through the toughest metals, the tool includes large slotted ventilating parts which are said to keep the heavy duty motor cool under heavy load.

The Thor Silver Line ½-Inch Drill features a highly polished mirror-like die casting case, free speed of 500 r.p.m., full ball-bearing construction, removable dead handle, steel bearing inserts, removable switch handle, precision gearing, and 3-jaw Jacobs key type chuck. The length of the drill is 11 inches.

G-S Protective Mask

A protective mask consisting of a plastic shield, which is held in position by an adjustable elastic head band, and replaceable laminated filters of extra thickness is now being offered by the General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Pa. The mask is said to protect the throat, nose, and bronchial tubes from large particles of non-toxic dusts that tend to cause irritation to these membranes.

Weighing less than ½ oz., the G-S Protective Mask is claimed to be cool and unusually comfortable to wear. It is particularly recommended for use in foun-



G-S Protective Mask

dries, machine shops, factories, mills, and other locations except where fine silica, lead, arsenic, and other toxic dusts are present.

BEVERLY Stations

SHEAR

"S-3" Slitting Shears for slitting, cutting and trimming sheet steel or any other material, have compound power transmission, which provides smooth, easy operation. Interchangeable and adjustable blades of high quality tempered and drawn tool steel are firmly held in alignment by the rigid frame to assure clean cutting, regardless of the thickness of metal—up to capacity. Unique adjustable shoe, bearing on upper blade holder, provides additional support, for the upper blade, which increases the strength and cutting efficiency of the Shear.

Slitting capacity 1/8"; trimming 3/16"; bar capacity 1/4" x 2" (capacities given are in mild steel)

Ask your Beverly Dealer for a demonstration or write for full details and illustrated circular.

High Carbon High Chrome Blades for cutting stainless available on special order.

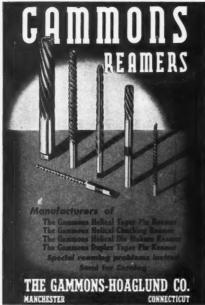


"Jet-Edge" Welded Edge Hack Saw Blade

A high speed welded edge hack saw blade that is claimed to be shatterproof and unbreakable has been introduced by the Millers Falls Co., Greenfield, Mass. Known as the "Jet-Edge," the blade is said to feature an extremely hard edge and unusual resistance to abrasion, so that the teeth are kept in cutting condition over a long period of use.

According to the manufacturer, the Jet-Edge cuts fast and accurately due to its strong unbreakable back which can be







"Jet-Edge" Welded Edge Hack Saw Blade

highly tensioned for the application of maximum feed pressures without blade deflection. The blade is available in a wide variety of sizes ranging from 12 inches long x 1 inch x 0.049 inch thick to 30 inches long x $2\frac{1}{2}$ inches wide x 0.100 inch thick.

"Eutec-Silver-Weld" Pocket Economizer

For the smaller shop and for home use, the Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y., announces the availability of the "Eutec-Silver-Weld" Pocket Economizer for the joining of all metals except aluminum. This handy unit contains a coil of high silver alloy arranged to feed through a small hole in the top of the unit. A separate compartment in the bottom contains a jar of high performance Eutector Flux that is specially made for use with the alloy to ensure lowest heats of application.

The Eutec-Silver-Weld alloy is especially recommended for joining steel, copper, brass, bronze, stainless steel, and



MODERN MACHINE SHOP

February, 1949

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malleable iron and can be readily applied with oxyacetylene, gas, Prestolite, and large gasoline torches.

Gairing Heavy Duty "E-Con-O-Mill"

Designed for roughing operations where the greatest wear occurs along the periphery of the tool, a heavy duty model of its "E-Con-O-Mill" is announced by



Gairing Heavy Duty "E-Con-O-Mill"

The Gairing Tool Co., P. O. Box 478 Roosevelt Park Annex, Detroit 32, Mich. The face mill includes blades which are set at an angle to allow for maximum adjustment in a radial direction.

The extra heavy body of the cutter is made in sizes 8 inches in diameter and larger. All body sizes are equipped with the same size of tungsten carbide tips, blades, and locks as used on the regular (cone-type) E-Con-O-Mill.

The Gairing Heavy Duty E-Con-O-Mill can be obtained with three types of blades for cutting steel, cast iron, and non-ferrous material.

Splashproof Actuating Switch

A rugged, splashproof switch for actuating electric counters is announced by the Production Instrument Co., 702-12 W.



The RPM's stay up while grinding...not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind — not just rub. The speed of Kipp air grinders drops but slightly when put to work. That means better work—longer wheel life.

Buy Kipp air tools for best results, lower prices.





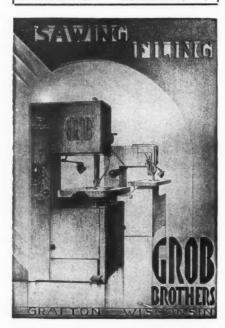
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4422 APPLETON ST. CINCINNATI 9, OHIO

Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

Let us have your inquiries.

BLOOMFIELD TOOL CORP.

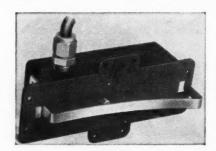
37 FARRAND ST. BLOOMFIELD, N. I.



Jackson Blvd., Chicago 6, Ill. The case is cast aluminum, accurately machined and assembled with a gasket. Fittings for waterproof cable are said to provide for splashproof electrical connection.

The actuating arm is nickel silver, specially shaped to count circular objects of 34 inch or more in diameter without space between the objects, as illustrated herewith. The operation requires a direct force of 4.2 ounces. The arm must be depressed 12 inch for positive counter actuation.

The switch includes a flanged base with

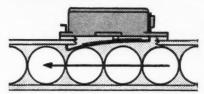


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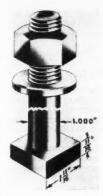
Splashproof Actuating Switch

eight holes which provide for convenient mounting under widely varied conditions. The switch is 6 inches long x 1% inches wide x 1% inches deep, not including the operating arm.

Boyar-Schultz 1-Inch Alloy Steel Special Machine Bolt

Precision made of alloy steel and heat treated for maximum properties, a 1-inch special machine bolt said to conform in dimensions and standards of strength to the requirements of leading large press manufacturers and users has been placed on the market by the Boyar-Schultz Corp., 2110 Walnut St., Chicago 12, Ill. The bolt is accurately threaded to a close fit and is provided with a rust-resisting

Feb



Boyar - Schultz 1-Inch Alloy Steel Special Machine Bolt

Nuts of special alloy steel, carefully threaded to match the bolt threads, are available, as well as heat-treated washers having chamfered edges and both sides ground for parallelism and hardened.

Nox-Rust Vapor Wrapper

Nox-Rust Vapor Wrapper, a special kraft paper treated with a synthetic chemical for use in the corrosion-proof

packaging of steel and iron, is now being marketed by the Nox-Rust Chemical Corp., 2419 S. Halstead St., Chicago 8, Illinois.

According to the manufacturer, the wrapper is as quick and easy to use as ordinary wrapping paper, and the slow vaporization of the synthetic chemical

contained in the wrapper completely surrounds the part with a vapor sheath which prevents all corrosive action of both moisture and air. The wrapper, it is claimed, need not be sealed or even tightly wrapped to provide this protection, and it is not necessary for the wrapper to come into contact with the part. Even the presence of moisture and water within the package will not cause corrosion since the chemical vapor mixes with the moisture and renders it harmless, the manufacturer claims.

Cycling humidity and temperature changes are said to have no corrosive effect on parts when protected with Nox-Rust Vapor Wrapper. The vapor arising from the wrapper is stated to be odorless, non-toxic, and non-injurious to the skin. The chemical, it is claimed, is very stable and is not consumed in preventing corrosion.

Nox-Rust Vapor Wrapper can be used for the protection of such parts as saw blades, bearings, piston rings and sleeves mechanics' tools, knives, files, lathes, machine tools, cutting tools, taps, dies, drills, sheet steel, and bar steel. If desired, the material can be made into envelopes or other forms to facilitate packaging.

● Make the most of your tool maker's time by reducing set-up time on Jig borers, milling machines, slotters, planers, boring mills, punch presses, etc.



Northwestern T nut and stud sets eliminate the time spent looking for correct length studs for each set-up. They are available in sets to fit all machinery.



Northwestern step block sets eliminate time spent looking for hit-or-miss temporary blocks and shims for each set up. Write today for detailed bulletin and selection chart showing various types and size of stud sets which we carry.

NORTHWESTERN TOOL & ENGINEERING CO.

119 HOLLIER AVENUE DAYTON 3, OHIO

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Mead FT-101 Air Valve

As a companion to its FT-1 series, the Mead Specialties Co., Dept. FT-42, 4114 N. Knox Ave., Chicago 41, Ill., has announced a three-way air valve, designated as the FT-101, which has minimum di-



Mead FT-101 Air Valve

ameter openings of 75 inch throughout, thereby making it quicker-acting with the larger air cylinders yet retaining the light touch and instant response features of the smaller FT-1 valves, the manufacturer states.

Of the poppet type, the FT-101 is fitted with hose nipples to accommodate %-inch I.D. and up to %-inch O.D. hose. Mounting holes at both the top and sides of

Imported—SWISS
Collets and Carbide Bushings

FOR SWISS TYPE SCREW MACHINES

Most fractional sizes shipped from stock.

G and D Sales Co.

111 Dillerville Road

Lancaster, Pa.

the rectangular valve body facilitate attachment to any machine for either camor finger-tip operation.

Defiance No. 1209 Bench Vise

Stanley Tools, New Britain, Conn., announces a light duty auxiliary bench vise designated as the Defiance No. 1209. The vise features a spring take-up on the screw which is claimed to eliminate inefficient jaw action. The movable jaw operates on two steel rods and an accurately threaded steel screw. Both vise jaws are accurately machined and smooth finished to meet squarely.

Due to its lightweight and clamp type



Defiance No. 1209 Bench Vise

base, the Defiance No. 1209 Vise is claimed to be ideal for setting up on the job. The vise has a jaw width of 2½ inches and jaw opening of 2¾ inches.

ROTARY FILES

100,000 Hi-Speed Rotary Files, Countersinks, Router Bits
All Shapes—All Sizes—For Any Job

MARKED DOWN - 50% DISCOUNT

HOBBY SHOP 1/8" - 3/32" SHANK—HI-SPEED AND CARBON MIDGET MILLS
Sales Representation Wanted — Open Territory — Write for Quotations — Catalogue

PATTERSON TOOL CO.

1307 E. Genesee St.

Saginaw, Mich.

New Books

Design for Welding. Published by The Jumes F. Lincoln Arc Welding Foundation, Cleveland 1, Ohio. Over 1,000 pages, 51/2 x 71/2 inches, profusely illustratwith photographs, drawings, tables and cost data. Bound in semi-flexible smulated leather covers. Price \$2.00. postage prepaid in the United States; \$2.50 elsewhere.

A significant record of the progress of are welding throughout all industry dur-

ing the postwar years is contained in this book, which is composed of abstracts of 82 award papers in the recent James F. Lincoln Arc Welding Foundation "Design - for - Prog-ress" Award Program. The papers were selected and edited by Professor R. S. Green, Acting Chairman of the Department of Welding Engineering of the Ohio State University, Columbus, Ohio.

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In the preface of the book Professor Green states that he has prepared the book with the purpose of making available a record of representative welded designs. He has placed emphasis on projects produced and in operation with the objective of providing engineers and industry generally with a variety of ideas which may be adaptable to their own products or structures. The book contains a liberal presentation of cost data on the various designs which afford a sound means of making a comparativestudy of methods.

Professor Green also calls attention to the present trend in the development of welding applications as evidenced by these papers. More papers speak of welding as used on production items rather than as applied to single units. Many of the papers describe the application of welding directed to the reduction of manufacturing costs and the improvement of quality and performance.

Papers included in the book are classed into the following categories: Aircraft. Automotive, Railroad, Watercraft, Con-



Shop men choose PROCUNIER **Tapping Heads for** Top Performance!

When the men in the shop specify tapping heads, they choose Procunier — and for many good reasons: Consistent, accurate tapping and faster tapping with a minimum of tap breakage . . . as reported by actual users over the . has made "Procunier" the years . standard of the industry. The sensitive, double-cone friction clutch, which engages the surfaces of the drive and reverse shells with a soft, "cushioned" action . . . the heat-treated reversing mechanism...the ball bearings for accuracy . . . the single-hole lubrication, have made Procunier noted for consistently better performance. See how these Procunier Heads . . proven on all kinds of jobs for over 30 years . . . can save you time and

Procunie Safety Chuck Company

12 S. CLINTON ST., CHICAGO 6, ILL.



"TRU-GRIP" Tap Holder Lighter, smaller in diameter, it affords easier tapping close to

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"chew	ed u	D''	top
shanks			

INCOLAR
lustrated brochures which give on Procunier High Speed Tap-

tainers, Furniture, Structures, Machinery and Welderies. Each section contains papers describing outstanding accomplishments in that particular field. The Machinery and Structures sections are especially strong and the quality of the papers evidences the advance in design in these fields.

Assisting Professor Green were associate editors Professor Douglas C. Williams and Professor Charles B. Smith, both of the Ohio State University, in addition to numerous consulting editors

chosen from industry.

PRECISION COMTORPLUG INTERNAL GAGE

Machine operators increase percentage of acceptable work

INTERCHANGEABLE This indicating gage shows actual EXPAN-measurement of holes to fractions of SION .0001", yet is pactical for machine Plugs operators (as well as inspectors) because of self-positioning for true 2-point gaging, and fool-proof rug-.125 to gedness. Detects tapers and out-of-round. No wires, no air hose. Operators control machines better, produce higher average standard work. Request new Bulletin 40.

THE COMTOR CO. WALTHAM S4, MASS.





McDONOUGH MANUFACTURING CO. EAU CLAIRE, WISCONSIN, U. S. A

Introduction to Gas-Turbine and Jet-Propulsion Design. By Carl A. Norman and Richard H. Zimmerman. Published by Harper & Brothers, College Department, 49 E. 33rd St., New York 16, N. Y. 286 pages. Illustrated. Cloth binding board covers. Price, \$5,00.

Described as an invaluable text for aeronautical, automotive, and marine engineers, this book deals with gas turbines for stationary, aircraft, marine, and locomotive plants, and with rockets. It goes thoroughly into both the performance and design of details of gas turbines

and jet propulsion apparatus.

Since the work is an elementary one designed for the beginner in the field, the authors have carefully avoided all theoretical complexities that do not contribute to fundamental understanding and intelligent use in design. Many sample computations of actual design problems are presented. Unusually well illustrated, the book includes nearly 200 figures, performance graphs, and photographs. Also provided in the book are two large tipped-in charts.

Managerial Control of Business. George T. Trundle, Jr., editor-in-chief, and S. A. Peck, associate editor. Contributing editors: W. E. Savage, R. C. Trundle, R. P. Brooks, Jr., H. L. Wood, C. A. Hyre, C. O. Malpas, and A. Dangler, Jr. Published by John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y. 408 pages. Cloth binding, board covers. Price, \$5.00.

This volume is designed to cover the entire field of business management, stressing principles and sound practices that are actually applied in modern industry. The material presented is based on an extensive and practical experience covering 29 years of management engineering service to every type and size of enterprise.



The text is divided into five sections headed as follows: "Analyzing the Company Operation." "General Management Problems," "Sales Management," "Manufacturing," and "Industrial Relations." The first section deals in condensed form with the overall study to determine the kind and degree of existing problems. Later sections cover in more detail the solutions of problems uncovered by the study outlined in Section 1 and are cross-indexed by chapter to the specific chapters in Section 1. In Section 4, particularly, the chapters on maintenance, production control, and labor control relate in detail their application to a manufacturing enterprise. Owing to their importance in any plant producing goods for sale to the American consumer, the authors have made the treatment of these subjects as specific and as explicit as possible.

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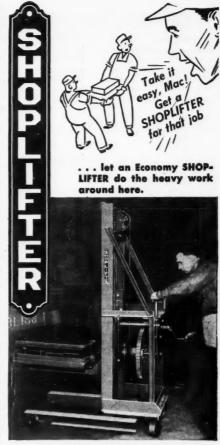
of

Jigs and Fixtures. 5th Edition. By Fred H. Colvin and Lucian L. Haas. Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 410 pages. Illustrated. Cloth binding, board covers. Price, \$4.50.

This volume provides information covering all aspects of the design and use of jigs and fixtures. It answers questions regarding standard practice in large shops and shows the reader how he can adopt these practical methods for his own use.

Standard data have been brought up to date in this revised edition, and new material has been added on jigs and fixtures for various machining operations. Each item entering into the proper design of jigs and fixtures is given careful attention, such as arrangement of views, lines and line work, dimensioning, screw-thread representation for bolts and threaded parts, and so on.

In addition to an introduction, the book includes a total of 16 chapters headed as follows: Designing Jigs and Fixtures; Advantages of Tool-Design Standards; Details of Fixture Design; Welded, Cast-Iron, and Light Metal Fixtures; Locating Schemes for Drill Jigs and Fixtures; Machine Vises and Vise Jaws; Clamps and Clamping Methods; Drilling Jigs and Fixtures; Drill-Jig Bushings; Types of Drill Jigs and Fixtures; Pneumatic Fixtures for Holding Work; Milling Fixtures; Grinding Machine Fixtures; Welding and Assembling Fixtures; Fixtures for Inspecting Work; and System in the Toolroom.



Every shop needs a SHOPLIFTER. Saves men, saves materials. Besides handling heavy dies, the SHOP-LIFTER can stack drums and boxes, unload street trucks, pick up skids and be used as an adjustable height table.

All steel, arc welded frame. Easily operated hoist unit with automatic brake, safely holds load at any height.

Type D. hand operated

Type D, hand operated......\$157.50
Type DE, electric 1/3 HP unit......\$315.00
1000 pound capacity

Type DX, hand operated.....\$320.00 2000 pound capacity

Type DX, hand operated......\$370.00

Floor lock to hold machine steady: \$10.00 extra for 500 pound sizes; \$15.00 extra for type DX models.

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New Shop Literature

"American" 20-Inch Medium Duty
Type Pacemaker Lathe, product of The
American Tool Works Co., Pearl St. at
Eggleston Ave., Cincinnati 2, Ohio, is illustrated and described in a four-page
two-color bulletin released by this firm.
Complete dimensions and standard equipment of the machine are conveniently
tabulated. Copy of Bulletin No. 16-C free
upon request.

K-P Industrial Wire Cloth and Woven Wire Screens are illustrated, described, and listed in a 48-page catalog published by Korb-Pettit Wire Fabrics & Iron Works, Inc., Dept. MMS, 1505-15 N. Mascher St., Philadelphia 22, Pa. Included in the catalog are data on how to specify and order wire cloth and wire screens; types of weaves and crimps; hooked edges; double-crimp wire cloth; square mesh market grade wire cloth; and extra fine wire cloth. In addition, conversion and other helpful tables are provided at the rear of the catalog.

Copy of Catalog No. 36 is available free to mechanical executives upon request.

Northwestern Set-Up Products. The Northwestern Tool & Engineering Co., 117 Hollier Ave., Dayton 3, Ohio, now has available a four-page catalog presenting illustrated, descriptive, and tabular information on T-nut and stud sets, step block sets, jig and fixture parts, knurled head screws, quarter turn screws, shoulder screws, double end jig feet, and screw and press-fit type jig feet. Newly added items include 10-24 and 1/2-13 knurled head screws and 10-24 quarter turn screws. A selection chart for studs is included on the rear page of the catalog, copy of which is available free upon request.

Airco Hardfacing Alloys. A booklet covering its complete line of Airco hardfacing alloys has been published by the Air Reduction Sales Co., Dept. 1968, 60 E. 42nd St., New York 17, N. Y. The 16-page two-color profusely illustrated booklet, which also serves as a hardfacing catalog, describes each alloy in complete detail. Included are data on typical uses, specifications, application technique, deposit hardness, color markings, and deposit analysis. Copy free upon request.

DRILLING WITH THE Speed-Right?



Each drill size and material require different speeds for peak production. Wrong speed lowers output, shortens drill life, and raises cost per hole. The modern variable speed governor control Speed-Right press is the answer to high profit drilling at the correct speed.

Any speed instantly, held right by governor at Min. to Max. load. 1000-10,000 or 2500-15,000 R.P.M. Capacity .004-.156".

Investigate the **Speed-Right** sensitive single, multiple and air-feed press today. PRICED FROM \$136.50. Immediate delivery . . .

Write for bulletin 308



Engineering Service without obligation

oo it right with "Speed-Right"

THE ELECTRO-MECHANO CO. 261 EAST ERIE STREET Milwaukee 2, Wisconsin

Whitney-Jensen Sheet Metal Tools. A 46-page catalog covering its complete line of sheet metal tools is announced by the Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill. Copy of Catalog No. 16-49 free to mechanical executives on request.

Cornelis Thread-Generating Machine. The George Scherr Co., Inc., 198-A Lafayette St., New York 12, N. Y., has published a four-page folder that illustrates and describes in detail the Cornelis Thread-Generating Machine which is intended for cutting screw threads, lead screws, and worms by an improved generating method. Copy free upon request.

Progressive Roller Head Seam Welders. An eight-page technical bulletin issued by the Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich., describes its line of "quick follow-up" roller head seam welders which comprises three basic sizes for light, medium, and heavy duty work, each size being available in three types-for circular welding, for longitudinal welding, or for both circular and longitudinal welding. Important points of design and operations of the welders are made plain with text, closeup views, and labeled drawings. Numerous special Progressive seam welders are also pictured. Copy of Bulletin No. 804 free upon request.

Hydraulic Presses. The Baldwin Locomotive Works has issued two bulletins describing the line of Southwark presses and power tools engineered and built by the company. Bulletin 285, which comprises 12 pages, contains 37 illustrations of miscellaneous types of hydraulic presses ranging in capacity from 100 to 6,000 tons for the high speed production and accurate forming of sheet metal parts to any desired shape. Bulletin 286, which also comprises 12 pages, contains 21 illustrations of standard and custombuilt steam platen presses for use in the fabricating of belting, brake lining, gaskets, packing, grinding wheels, molded rubber goods, plastic laminates, polished plastic sheets, printing plates and mats, and other products.

Copies of Bulletins 285 and 286 may be obtained by writing to the Advertising Department, The Baldwin Locomotive Works, Eddystone, Pennsylvania.

TOOL UP FOR THRIFTY TAPPING AND THREADING

Ettco-Emrick

attached to your drill press spindle, offer a low-cost way to tool up for a wide range of tapping needs at high speeds. Hair-trigger sensitive clutch protects taps and work. Ettco Tappers are ideal where



7 Sizes for No. 0 to 1" Taps

cost, production and accuracy are important factors. Quill clamps are available for maximum rigidity.

4 Sizes for

ttco-Emrick HREADERS

are standard Ettco Tappers fitted with acorn or button-type die-holders and dies. They put threading work on a high-speed production basis. Their highly sensitive action assures ac-No. 6 to 3/8" Dies curate, low-cost work.

WRITE FOR BULLETIN 22

it gives details and prices on Ettco-Emrick Tappers and Threaders. We'll also send you the name of your neaerst distributor.

ETTCO TOOL

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Boston, Massachusetts • Portland, Connecticut Detroit, Michigan Chicago, Illinois

DRILL & TAP CHUCKS . TAPPING ATTACHMENTS MULTIPLE DRILLING & TAPPING HEADS DRILLING & TAPPING MACHINES

Modern Self-Aligning Die Lifters, which are designed to provide maximum speed and safety in handling dies and other heavy objects having suitable threaded holes, are covered as to dimensions, specifications, prices, and construction details in a two-color illustrated bulletin released by the Modern Collet and Machine Co., 401 Salliotte St., Ecorse 18, Mich. Copy free upon request.

Miniature Ball Bearings. A two-color catalog on miniature ball bearings has been published by Miniature Precision Bearings, Inc., Keene, N. H. Eight pages are devoted to comprehensive specifications of more than 40 types and sizes of standard miniature ball bearings, including radial, super-light, pivot, angular contact, and thrust bearings, ranging in outside diameter from 2 mm. to f inch. Information is also included on variations of standard bearings and the supplying of special bearings in their size range. Moreover, the catalog provides data on lubrication, weights, applications, and other material of particular interest to designers of precision mechanisms. Copy of Catalog 49 is available free upon request.



Users find "Oliver" Belt Grinders unmatched for polishing bronze tablets, aluminum and brass castings, etc. Convenient and efficient on work in its capacity. Table supports flat work 46"x26", finishes in one setting. Other sizes available. Ask for Bulletin No. 298.

OLIVER MACHINERY COMPANY
Grand Rapids 2, Mich.

Standard Specialties" is the title of a 24-page two-color catalog published by The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y., which lists approximately 200 standard products made of Monel, nickel, and Inconel for corrosive and high temperature service. Among the "Standard Specialties" described and illustrated under 47 general classifications are balls, floats, nails, bolts, pickling slings and hooks, thermostat parts, thermocouple protection tubes, pipe and pipe fittings, gaskets, valves, cathodes, grease fittings, tags, Woodruff keys, wire rope, and vibration isolators.

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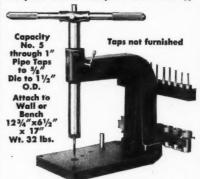
Copy of the catalog is available to industrial purchasing agents, engineers, product designers, and other executives concerned with purchase and product

specification.

Gray Turret Head Metal Cutter, available in different sizes for cutting a wide variety of metals of various thicknesses and gauges, is fully illustrated and described in a 12-page two-color catalog issued by The Gray Machine Co., P. O. Box 596, Philadelphia, Pa. Copy free upon request.

Lassy Universal Tap and Die Guide Fixture - \$49.75

Complete with 12 adapters No. 5 thru 5/8"



Guide can be removed from fixture for lathe and drill press work. Write for circular from your mill supply house or

LASSY TOOL COMPANY

90 Bohemia Street

Plainville, Conn.

Also Complete Line of Hand Tappers

Gemco Multi-Purpose Crank Shapers. A 24-page catalog printed in three colors and containing illustrations and a complete description of the Gemco line of multi-purpose crank shapers is now being distributed by the General Engineering & Manuacturing Co., Dept. MM, 4417 Oleatha, St. Louis 16, Mo. The catalog treats each feature of engineering—tool head, ram, crossrail, column, base, transmission, bull gear assembly, rocket arm, "Lubrigard" and lubricating system, Unilateral table control, rapid traverse, feed mechanism, stroke adjustment, centralized controls, and accessor-

ies - separately by illustration and description for clarity and understanding. A table of complete specifications on each model of Gemco shaper (plain, production, and universal) is a feature of the catalog, copy of which is available free upon request to mechanical executives addressing requests on their company letterheads.

Natco ' Holesteel" Model C Type A Drillers and Tappers are featured in a 16page two-color bulletin published by the National Automatic Tool Co., Dept. 27, Richmond, Ind. Three machine sizes are illustrated and described in detail, with views of outstanding features presented, as well as five actual records of production on the job. In addition, complete specification data are included.

Copy of Bulletin 748 is available free to individuals addressing requests on their company letterheads. Threadwell Gages. A 48-page catalog and price list with easy reference tables to determine selling prices for its line of fixed gages is announced by the Threadwell Tap and Die Co., Greenfield, Mass. Covered are adjustable limit plug and snap gages, cylindrical plug gages, dial indicator snap gages, length gages, pipe thread gages, ring gages, setting discs and plugs, thread roll snap gages, thread checkers, thread gages, thread measuring wires, and various accessory equipment. Copy of Price List and Catalog No. 48G is available free to mechanical executives.

DESIGNED FOR DE-STA-CO PORTABLE

This progressive trailer coach manufacturer designed his frame of square tubing for line assembly by welding. It takes pressure to draw formed tubing together for welding - it takes fast action to keep handling costs low - it takes De-Sta-Co Portable Plier clamps to meet all the qualifications this rapid production demands. You, too, can rely on their quick, positive toggle lock and release, their ample clamping pressure and easy adjustment to varying thicknesses and their wide, deep jaws for your bulky, awkward jobs.

These NEW De-Sta-Co Portable Clamps are machined forgings with deep-section jaws and grips. Bearing pins are long-wearing stainless steel. Models 468 and 474 are available with spring compensating or screw adjustment.

Write for folder describing Portable Toggle Clampsor our general catalog No. 47.



Portable Clamp Uses:

Assembly of

- Sheet metal ducts, cabinets, furnaces . . .
- Aircraft frames and
- Truck and auto bodies . . .

 Wood and plastic laming-
- For drilling, welding, rivet-







DETROIT STAMPING COMPANY
349 Midland Ave., Detroit 3, Mich.

Brown Electronik Potentiometers are featured in a 32-page catolog issued by The Brown Instrument Co., Wayne & Roberts Aves., Philadelphia 44, Pa. Among the instruments and systems covered in the catalog are strip chart electric control potentiometers, pyrometric switches, and thermocouple and radiamatic assemblies. A feature of the catalog is the presentation of illustrative tables of various control forms, typical control systems, style selection tables, and other data helpful in the selection of proper instrumentation. Copy of Catalog No. 15-13 free upon request.

bulletin released by the Allis-Chalmers Manufacturing Co., S. 70th St., Milwaukee 1, Wis. Typical installations of the motors in various types of plants are shown and explained. Copy of Bulletin 51B6145A free upon request.

Grannan Lubricator Valve for single line centralized lubrication systems is fully illustrated and described in an 8page three-color booklet published by Titeflex, Inc., 677 Frelinghuysen Ave., Newark 5, N. J. Data regarding valve selection and installation are included, and the operation of the lubricator is clearly explained by means of cross-sectional drawings. Copy free upon request.

Allis-Chalmers Explosion-Proof Motors,

available in sizes from 1 to 250 h.p. for

use in hazardous locations, are pictured

and described in a four-page two-color

Ducon Centrifugal-Wash Collectors for the economical and efficient control and suppression of dust and fumes are illustrated and described in a four-page twocolor bulletin issued by The Ducon Co., 147 E. Second St., Mineola, N. Y. Typical installations of the collectors are shown, and a condensed table of capacities of the various sizes of collectors is included. Copy of Bulletin No. CW-48 free.

Webber Heavy Duty Gage Blocks and Fixtures. A four-page two-color folder descriptive of heavy duty gage blocks with claimed accuracy of ±0.000005 inch, as well as various fixtures for use with the gage blocks, has been prepared by the Webber Gage Co., 12900 Triskett Rd., Cleveland 11, Ohio. Included are illustrations showing typical applications of the blocks and fixtures. Copy free.

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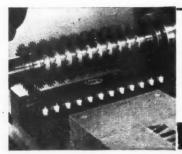
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Firthite Sintered Carbide Tips, Tools and Specialties. The Firth Sterling Steel & Carbide Corp., McKeesport, Pa., has published a 28-page catalog which lists and describes the company's standard line of sintered tungsten carbide tips and tools, boring bits, and Mechanigript adjustable toolholders, as well as special tips, nibs, and wear parts made to user's specifications. Copy of Catalog FE-127 is available to individuals addressing requests on their company letterheads.

Falk "Steelflex" Coupling Selector. A coupling selector released by The Falk Corp., 3010 W. Canal St., Milwaukee, Wis., is intended for use by draftsmen, engineers, designers, plant engineers, and the multitude of other men who are instrumental in the selection and purchasing of flexible couplings. The selector is designed to facilitate the selection of "Steelflex" couplings from size 3F up to size 18F by a handy three-dimensional method (by horsepower, by application, and by the r.p.m. at which the coupling is to travel). The selector is available to interested individuals addressing requests on their company letterheads.

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3628 DETROIT AVE. TOLEDO, OHIO Atlas Roller Chain. A four-page twocolor price list of single and multiple roller chain, as well as roller chain attachments, is now being distributed by the Atlas Chain and Manufacturing Co., Castor and Kensington Ave., Philadelphia 24, Pa. Copy free upon request.

"Ucilon" Specialized Industrial Protective Coatings are discussed in a four-page two-color illustrated folder issued by United Chromium, Inc., 51. E. 42nd St., New York 17, N.Y. Included are data on the features, advantages, physical properties, and applications of the coatings, which are intended for the protection of metal, concrete, and wood. Copy free upon request.

"Standardize with Standard" is the title of a four-page two-color bulletin issued by The Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, which presents illustrated, descriptive, and complete tabular information on the company's "Cadet" line of grinders, polishers, and buffers. Both bench and pedestal type units are covered, as well as the company's "Air-rester" dust collecting system. Copy of Bulletin 112 free upon request.

F-S "Steelset" Dressing and Truing Tools. The Fish-Schurman Corp., 230 E. 45th St., New York 17, N. Y., now has available a bulletin illustrating and describing sintered steel bond, impregnated diamond area-type dressing and truing tools which are designed to fit all types of grinding machines. List prices of the tools are included. Copy of Bulletin DT-328D free upon request.

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"Jalcase" Steel. Publication of a 16page two-color technical booklet on cold finished "Jalcase" Steel is announced by the Cold Finished Sales Department, Jones & Laughlin Steel Corp., Pittsburgh 30, Pa. The booklet contains complete information on the physical properties of this free-machining hearth steel, which is said to be ideal for use in the production of machined parts where high mechanical properties and good response to heat treatment are required. Copy of the booklet, which is generously illustrated with photographs and charts, is available free upon request.

Colonial Broach Sharpeners. A 12-page technical bulletin describing its complete line of machines for sharpening flat and round broaches is now available from the Colonial Broach Co., Box 37, Harper Station, Detroit 13, Mich. One page of the bulletin is devoted to each machine, including two flat broach sharpeners for handling broaches up to 32 and 65 inches long; three "round" broach sharpeners of broaches up to 36, 72, and 84 inches long; and two universal broach sharpeners for handling both round and flat broaches. Illustrations of each machine are labeled to show its features. In addi-

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Dust Collecting System. A description of a large capacity (suction and dust storage) dust collecting system for handling dusts, chips, lint, and so on, is contained in Bulletin A-550 issued by the Aget-Detroit Co., 403 Main at Washington, Ann Arbor, Mich. The bulletin contains ratings, specifications, and a detailed description of the operation of the Model 11B50 "Dustkop" which is designed to collect the dustladen air, clean it, and return it to the working space. Copy is available free upon request.



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Cincinnati "Filmatic" 20, 24, and 28-inch Heavy Duty Roll Grinding Machines are fully illustrated, described, and tabulated as to specifications in a 12-page two-color publication issued by Cincinnati Grinders Inc., Cincinnati 9, Ohio. Standard equipment supplied with each machine, as well as equipment supplied at extra cost, is conveniently listed. Copy of Publication No. G-587 free.

Go & Go Expansion Chucking Reamers with straight and taper shanks are illustrated, described, and listed as to dimensions and prices in a four-page two-color bulletin now being distributed by the Goddard and Goddard Co., P. O. Box 68, Brightmoor Station, Detroit 23, Mich. Copy of Bulletin No. 117 is available free upon request.

Lobdell Type GHV Roll Grinding Machine for use in the manufacture and refinishing of rolls for the paper, textile, fiber, rubber, paint, oil, and similar industries is illustrated and described in detail in an eight-page two-color bulletin published by the Lobdell Co., Wilmington, Del. Typical applications of the machine are shown on the back page of the bulletin, copy of which is available free upon request.

Industrial Diamonds and Diamond Tools are illustrated, listed, and described in a 12-page two-color booklet issued by Anton Smit & Co., Inc., 333 W. 52nd St., New York 19, N. Y. The booklet contains helpful suggestions for selecting the proper diamond tools, as well as important points for the proper and most efficient use of diamond tools. Copy free upon request.

Pangborn Hydro-Finish Cabinet for deburring, surface finish and lubrication control, removing heat treat scale and discoloration, preparation of surfaces for electroplating and other coatings, removing and blending directional grinding lines, finishing threaded sections for workability and fit, die and mold manufacture and maintenance, improved cutting tool life and appearance, and general maintenance cleaning is shown and described in a six-page bulletin published by the Pangborn Corp., Hagerstown, Md. Copy of Bulletin 1400 free upon request.

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Barrett Junior Catalog 487. A 100-page pocket-size catalog released by the Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9, Ill., contains illustrations and comprehensive information on the company's entire line of materials handling equipment, including hand, hydraulic and electric lift trucks, pallet trucks, the Nifty lifter system, skids, stacking frames, lifting and die tables, portable workbenches, hoists, elevators, portable cranes, hand trucks, barrel trucks, storage racks, and dollies. Copy of Junior Catalog 487 free upon request.

V & O "Stockmaster" High Speed Press, available in a number of sizes ranging from 10 to 90 tons pressure, is described and listed as to specifications in a four-page illustrated bulletin published by The V & O Press Co., Hudson, N. Y. Copy free upon request.

Bennett-Bilt Waste Receptacles. An eight-page two-color catalog illustrating and describing a complete line of waste receptacles with non-rusting stainless steel feet for industrial plants and other places is now being distributed by The Bennett Mfg. Co., Alden, N. Y. Copy of Catalog 548 free upon request.

South Bend 13 and 14½-inch Swing Precision Lathes equipped with 1-inch maximum collet capacity headstock spindles are described and priced in an 8½ x 11-inch four-page illustrated catalog published by the South Bend Lathe Works, 386 E. Madison St., South Bend 22, Ind. Also listed are chucks, collets, and other accessories for use with the lathes. Copy of Catalog No. 73 free upon request.

"The Starrett Story" is the title of a 32-page booklet issued by The L. S. Starrett Co., Athol, Mass., which traces the history of the origin, growth, and development of the company from the inspiration of the founder, Laroy S. Starrett, through wars, depressions, disasters, and prosperity to its present position as one of the largest manufacturing plants devoted exclusively to the production of hand measuring tools and precision instruments. Copy free upon request.



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11/16"	15	12	8.25	1"	20	15	16.00
23/32"	15	12	8.50	1-1/16"	20	15	17.00
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"The 'Pay Off' Wheel That Gives the Full Benefits from Centerless Grinding" is the title of an eight-page three-color bulletin offered by the Simonds Abrasive Co., Philadelphia, Pa. Definitely factual in content, the bulletin quotes filed reports indicating how ideal results in finishing and stock removal have been achieved in all types of centerless grinding. Suggestions for maximum operating efficiency and wheel recommendations for grinding on all types of metal are included. Copy is available free by requesting Bulletin ESA 55.

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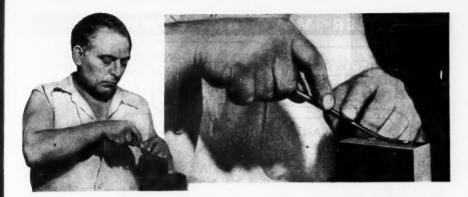
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TIPP

Over the Editor's Desk

Cost Reduction is Imperative

DUE to the high labor costs, prices in many lines have been forced up to such a point that a definite feeling of apprehension is developing that the point of diminishing returns has been reached. Of course, someone will point out that the cost of materials enters into this, but may we call attention to the fact that over 90 per cent of the cost of these materials consists of labor cost. Inasmuch as there seems to be no prospect of reduced labor costs in the near future, it becomes imperative for the manufacturer to do everything possible within his own plant to increase efficiency and eliminate waste.

To this end, a definite campaign for the elimination of waste should be inaugurated and responsibility for the program should be placed either upon an individual or upon a waste elimination committee. The committee might begin by exploring these possibilities:

- Check parts drawings to make sure that finish is not called for where no finish is needed.
- 2. Have the Receiving Department inspectors check all incoming castings carefully to make sure that you are not paying for pounds of excess stock.
- 3. Buy strip and bar stock in lengths which will leave the smallest amount of "short ends."
- Make sure that tool steel for single point tools is used in the most economical manner.
- Watch all tables, cabinets and stands in the machine shop to prevent the accumulation of partly used tool bits and other pieces of tool steel which can be salvaged.
- 6. Make sure that machines are set at the most efficient speeds; the amount of materials wasted in an attempt to operate machines at excess speeds will more than offset any gains made in production.
- 7. Make sure that motors and machine tools are lubricated frequently and correctly. A card system should be set up for recording the oiling of motors so that a positive check can be kept on this important function.
- 8. Make sure that the shop lighting is adequate and that special lighting is provided for layout tables, inspection operations and other operations where close work and positive accuracy are necessities.

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- Make sure that floors are in good condition at all times to avoid accidents to power trucks and to the employees.
- Set up a shop safety committee to be composed of responsible individuals to inspect all departments at regular intervals for hazards.
- 11. Help suppliers to operate more economically by grouping orders for supplies and materials, which will in turn result in savings for one's own shop.
- 12. Keep experimentation out of the shop; leave the experimenting to the methods engineers, but encourage the shop personnel to make suggestions that will save time or increase production by offering suitable rewards.
- 13. Insist that the foreman in each department know the condition of each machine under his supervision and that he order it repaired instantly if a part breaks or if the machine gives trouble, thus keeping repair costs down and eliminating time loss through idle equipment.
- 14. Make sure that jobs are not assigned to machines that are too large for them; use the smaller machine whenever possible.
- 15. Keep all machines clean and free from oil and grease; dust and dirt collected on machine surfaces are almost as deadly as acids.
- 16. Keep all shop windows clean; clean windows admit the maximum of light and tend to reduce electric bills.
- 17. Tools returned to the tool crib should be inspected before they are put away; if they are dull they should be resharpened, and if they are not in a good condition they should be repaired so that they will be ready for use when needed.
- 18. Keep metal shavings off the floor wherever possible, and where this is impossible, have the floor swept at regular intervals. This practice salvages the maximum of scrap metal, preserves the floor, and helps to prevent accidents.

These are only a few of the things that can be done to keep waste at the minimum. A good safety inspector or committee will find many more opportunities for savings along these lines.

Howard Campbug

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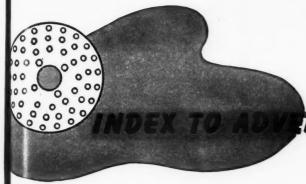
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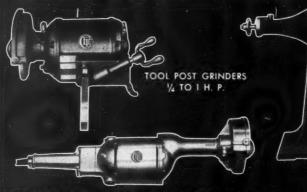
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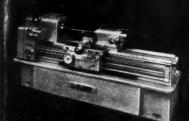
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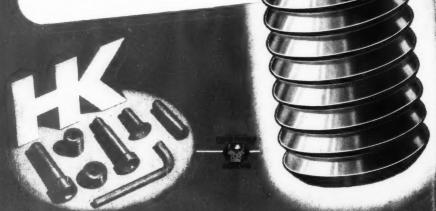
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